ROCKY MOUNTAIN ARSENAL

NORTH BOUNDARY CONTAINMENT/TREATMENT SYSTEM

OPERATIONAL ASSESSMENT REPORT

FY89

FINAL REPORT

BY

TECHNICAL OPERATIONS DIVISION
PROGRAM MANAGER, ROCKY MOUNTAIN ARSENAL
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13. ABSTRACT *(Maximum 200 words)*

THE OBJECTIVES OF THIS REPORT ARE TO DOCUMENT SYSTEM OPERATING PARAMETERS AND PERFORMANCE DURING FY89, AND, TO IDENTIFY AND DOCUMENT SYSTEM IMPROVEMENTS AND FACILITY ALTERATIONS IMPLEMENTED DURING FY89.

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PREFACE

This study was conducted as part of a cooperative effort by personnel from the Technical Operations Division (TOD) of the Program Manager for Rocky Mountain Arsenal (PMRMA) and the U.S. Army Engineer Waterways Experiment Station (WES). Funding for participation by WES was provided by the PMRMA via Intra-Army Order No. 0040. Project Management was provided by Messrs. David W. Strang, TOD, Norman R. Francingues, WES Environmental Laboratory (EL), and James H. May, WES Geotechnical Laboratory (GL).

The contributing authors to this report were Messrs. Jack H. Dildine, Douglas W. Thompson, Norman R. Francingues (WES-EL), Richard J. Lutton and John B. Palmerton (WES-GL). The report was prepared under the direct supervision of Messrs. David W. Strang (TOD) and Norman R. Francingues (WES-EL). The study and report were authorized by the PMRMA.

The authors acknowledge the support and assistance of the following people and organizations during this study: Ms. Dianna Pantleo and Ms. Tina Nowlin, D. P. Associates and Ms. Tommie Ann Gard of A.S.K. Associates.

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PART I: INTRODUCTION

Background

1. The North Boundary Containment/Treatment System* Operational Assessment described herein is the fifth in a set of reports prepared to document performance related to the boundary system operations. This report covers the operating period of October 1988 through September 1989 (FY89).

2. The report incorporates by reference major system descriptions and previous operations described in the report entitled "North Boundary Containment/Treatment System Performance Report" (Thompson et al. 1985). A chronology of events leading up to the expanded system construction, descriptions of detailed construction features, and geologic and hydrologic system descriptions is also described by Thompson et al. (1985). The reader is directed to the basic report for detailed information concerning the history and physical description of the system. The report is cataloged under the document 86078R01 at Rocky Mountain Arsenal Information Center (RIC).

Report Objectives

3. The objectives of this report are to document system operating parameters and performance during FY89, and, to identify and document system improvements and facility alterations implemented during FY89.

Approach

4. The Technical Operation Division (TOD) PMRMA provided the data bases and general technical guidance. The U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi (WES), provided specialized Environmental Engineering and Geotechnical assessments.

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* Hereinafter referred to as North Boundary System.

5. The study was conducted in three phases. Data were retrieved and organized by the TOD and Rocky Mountain Arsenal Information Center (RIC). The data bases were reviewed for completeness prior to conducting various system performance evaluations. During the course of study, several in-progress reviews and coordination working sessions were held at RMA to facilitate exchange of information and to assure continuity and consistency in data interpretations and evaluations. Finally, the report was assembled from individual sections prepared by the various contributing authors.

PART II: PLANT OPERATIONS MONITORING

6. The treatment plant monitoring program included collection of data on flow rates through the system and on the quality of the water entering and leaving the plant. The flow quantities were obtained from individual totalizing flow meters located upstream of each adsorber and on the combined effluent stream. The meters were read, and the values were recorded on a daily basis. Weekly flow quantities were calculated from the daily reports. Weekly flow rates were calculated by dividing the total flow for the week by 10,080 minutes per week. Flow rates for the dewatering and recharge wells were obtained from individual flow meters located in Building 808 (the treatment plant building).

7. Samples are taken weekly from the interior of the adsorbers for process control. These data are used in determining when to change carbon within the adsorber. Carbon change out is done on a batch basis since the carbon adsorbers are of the pulsed bed type. An aliquot of clean carbon is placed in the top of the adsorber and an equal amount of exhausted carbon is removed from the bottom of the adsorber. The chemical quality of the plant's influent and effluent waters was monitored by taking water samples on a weekly basis and analyzing them. Influent samples were collected from each of the three individual carbon adsorber influent lines from sampling ports located between the pre-filters and the adsorbers. A composite effluent sample was collected from a sampling port upstream of the post-filters. Influent and effluent samples were collected on a weekly basis. Samples from the dewatering wells were also collected periodically from ports located in the well pits.

8. All water samples were collected in previously cleaned, glass containers, sealed, and transported to the appropriate analytical laboratory at RMA or their contractor for analysis. The analytes for which the plant water samples were analyzed for during FY89 are presented in Table 1. All analyses were performed using standard methods. The sample analysis and flow data were entered into the analytical data base by laboratory personnel, subjected to a quality control routine, validated, and placed into the PMRMA data base by the RIC. Data sets were prepared for use in developing the tables and figures used in this report. Copies of the plant flow and analytical data for FY89 are contained in Appendices A, B, and C, respectively of this report.

Table 1

Chemical Analysis of Treatment Plant Samples

Analyte	FY 89 Quarters 1st	2nd	3rd	4th
Organochlorine Pesticides				
Aldrin	X	X	X	X
Endrin	X	X	X	X
Dieldrin	X	X	X	X
Isodrin	X	X	X	X
Hexachlorocyclopentadiene		X	X	
p,p'-DDE		X	X	
p,p'-DDT		X	X	
Chlordane		X		
Volatile Organohalogens				
Chlorobenzene		X	X	
Chloroform		X	X	
Carbon Tetrachloride		X	X	
Trichloroethylene (TCE)	X	X	X	X
Tetrachloroethylene		X	X	
1,1 Dichloroethylene		X	X	
1,1 Dichloroethane		X	X	
1,2 Dichloroethane		X	X	
1,1,1 Trichloroethane		X	X	
1,1,2 Trichloroethane		X	X	
Methylene Chloride		X	X	
1,2 Dichloroethylene		X	X	
Organosulfur Compounds				
P-Chlorophenylmethylsulfone (PCPMSO2)	X	X	X	X
P-Chlorophenylmethylsulfoxide (PCPMSO)	X	X	X	X
P-Chlorophenylmethylsulfide (PCPMS)	X	X	X	X
1,4-Dithiane	X	X	X	X
1,4-Oxathiane	X	X	X	X
Dimethyldisulfide (DMDS)		X	X	
Benzothiazole		X	X	
NP-Pesticides				
Vapona		X		
Supona		X		
Atrazine		X		
Malathion		X		
Parathion		X	X	

(Continued)

Table 1 (Concluded)

Analyte	FY 89 Quarters 1st	2nd	3rd	4th
Volatiles				
Dicyclopentadiene	X	X	X	X
Methylisobutylketone			X	
Bicycloheptadiene			X	
DIMP/DMMP				
Diisopropylmethylphosphonate	X	X	X	X
Dimethylmethylphosphonate			X	
DBCP				
Dibromochloropropane	X	X	X	X
Inorganics				
Arsenic		X	X	
Chloride	X	X	X	X
Fluoride	X	X	X	X
Sulfate		X	X	
Alkalinity		X	X	
Calcium		X	X	
Cadmium		X	X	
Chromium		X	X	
Copper		X	X	
Cyanide		X	X	
Mercury		X	X	
Potassium		X	X	
Magnesium		X	X	
Sodium		X	X	
Nitrogen NO_3/NO_2		X		
Lead		X	X	
Zinc		X	X	
Volatile Aromatics				
Toluene		X	X	
Benzene		X	X	
Xylene (o-, m-, p-)		X	X	
Ethylbenzene		X	X	
1,3 Dimethylbenzene		X	X	
GC/MS Analysis			X	

PART III: SYSTEM OPERATIONS AND FACILITY ALTERATIONS

Operational Summary

9. A record of plant operations for the North Boundary System (NBS) is maintained by RMA plant operations personnel with major events documented on a daily basis. This daily record contains information on the operation, maintenance activities, and repairs of the treatment plant equipment and dewatering and recharge wells. It also details other events such as plant downtime, equipment failure, and, filter and carbon removal and replacement.

10. The performance of the NBS treatment plant has been maintained through continued improvements and upgrade of the system. Overall downtime for the NBS has been steadily reduced over the years. The NBS was never totally out of operation for more than six consecutive hours during FY89. A summary of the downtime for each adsorber by quarter is presented in Table 2. Details on each downtime event are presented in Appendix D. The majority of the downtime was associated with carbon transfer which generally effected only a single adsorber. Other downtime resulted primarily from malfunctions of meters and mechanical parts, operational changes, and power outages.

Table 2

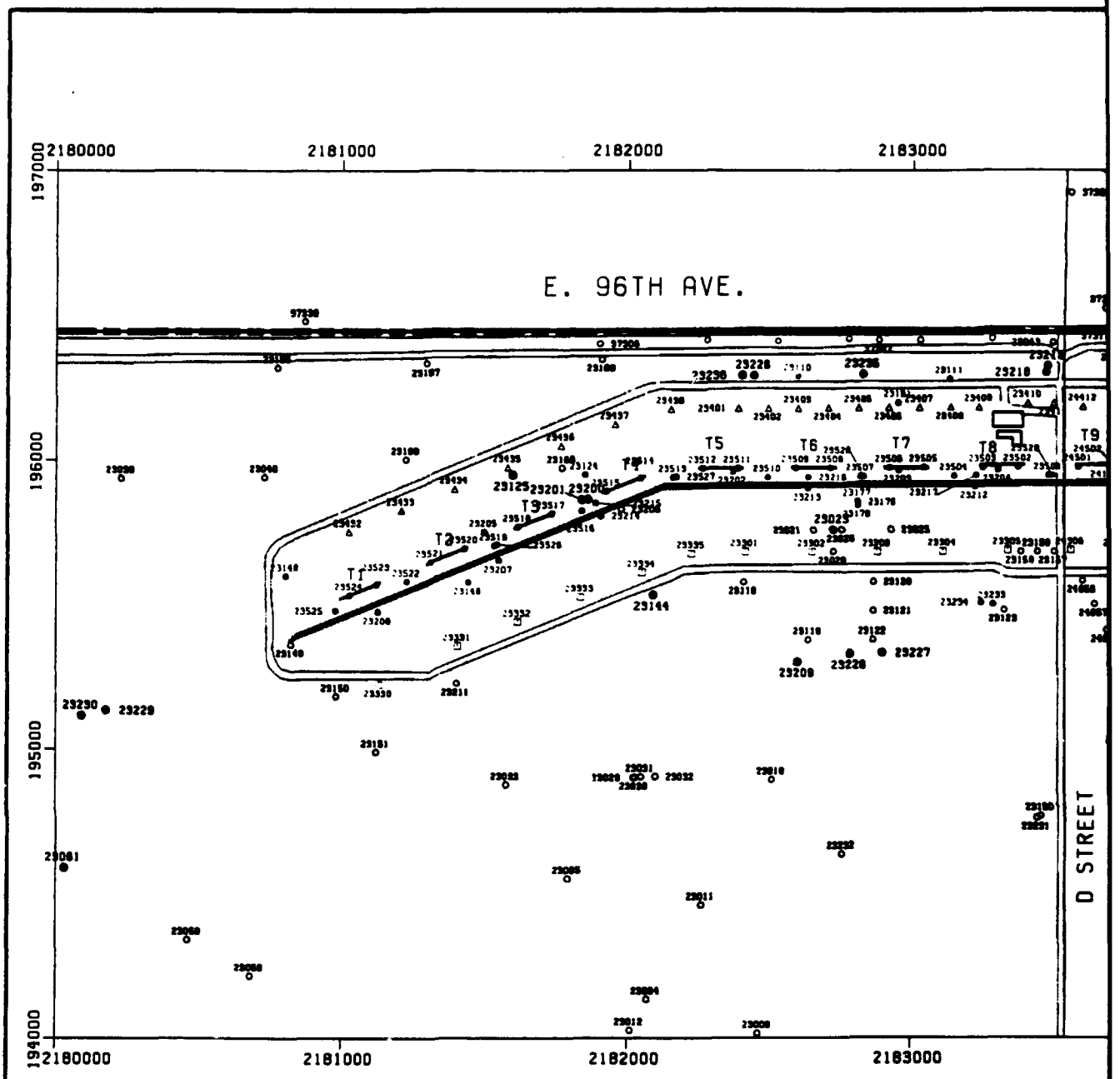
North Boundary System Treatment Plant

Downtime for FY89

	FY89 Quarter				
ADSORBER	1st (hrs)	2nd (hrs)	3rd (hrs)	4th (hrs)	TOTAL
A	65.2	22.2	24.4	27.2	139.0
B	15.9	22.5	64.6	23.5	126.5
C	71.6	0.0	0.0	0.0	71.6
PLANT	20.2	4.0	0.3	5.9	30.4

Facility Alterations

11. The major alteration to the NBS during FY89 was the installation of additional recharge trenches as part of an interim response action (IRA) for the NBS. A discussion of the new recharge trenches is presented in Part IV of this report. A layout of the NBS is presented in Figure 1.



LEGEND

- Alluvial Monitoring Wells
- Denver Monitoring Wells
- Dewatering Wells
- Piezometers
- Recharge Wells
- Drainage
- Road
- Structure
- Trench
- Slurry Wall
- Arsenal Boundary

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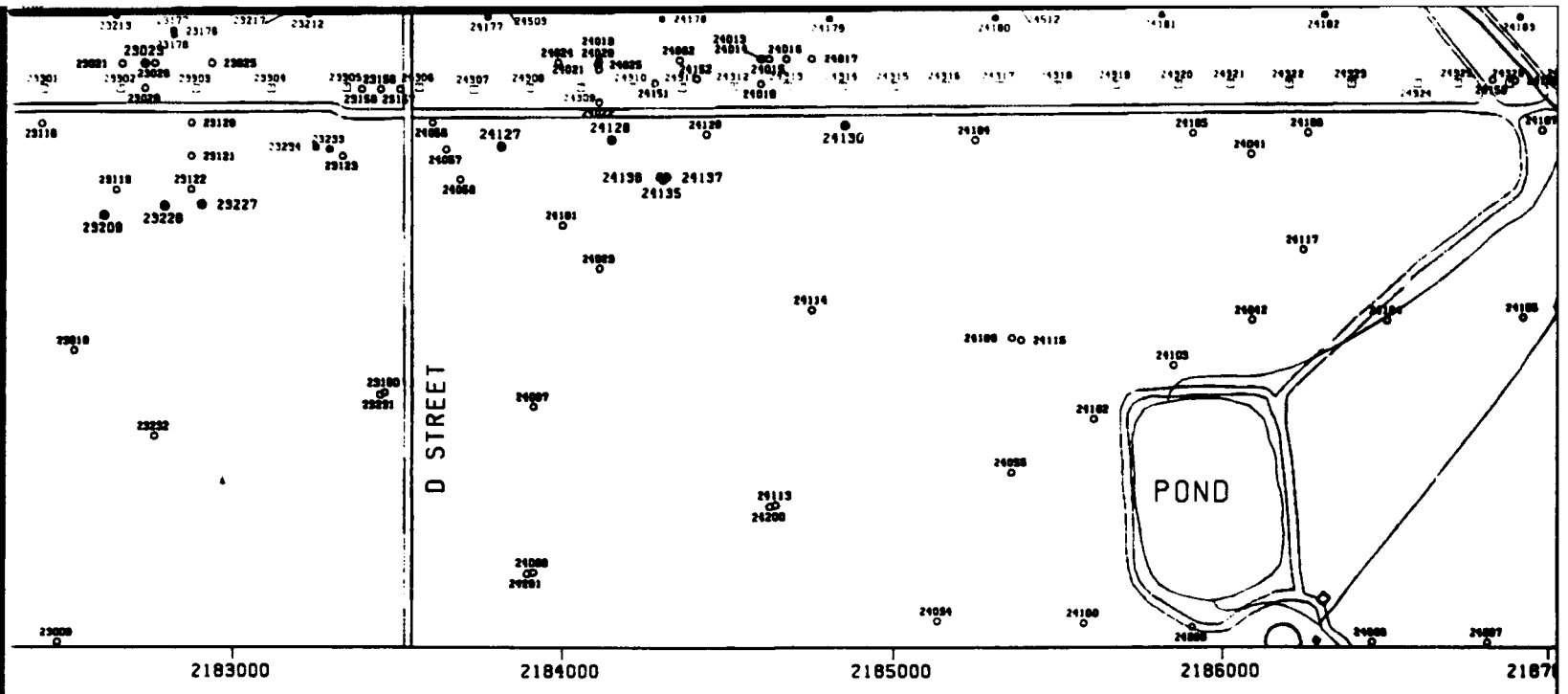

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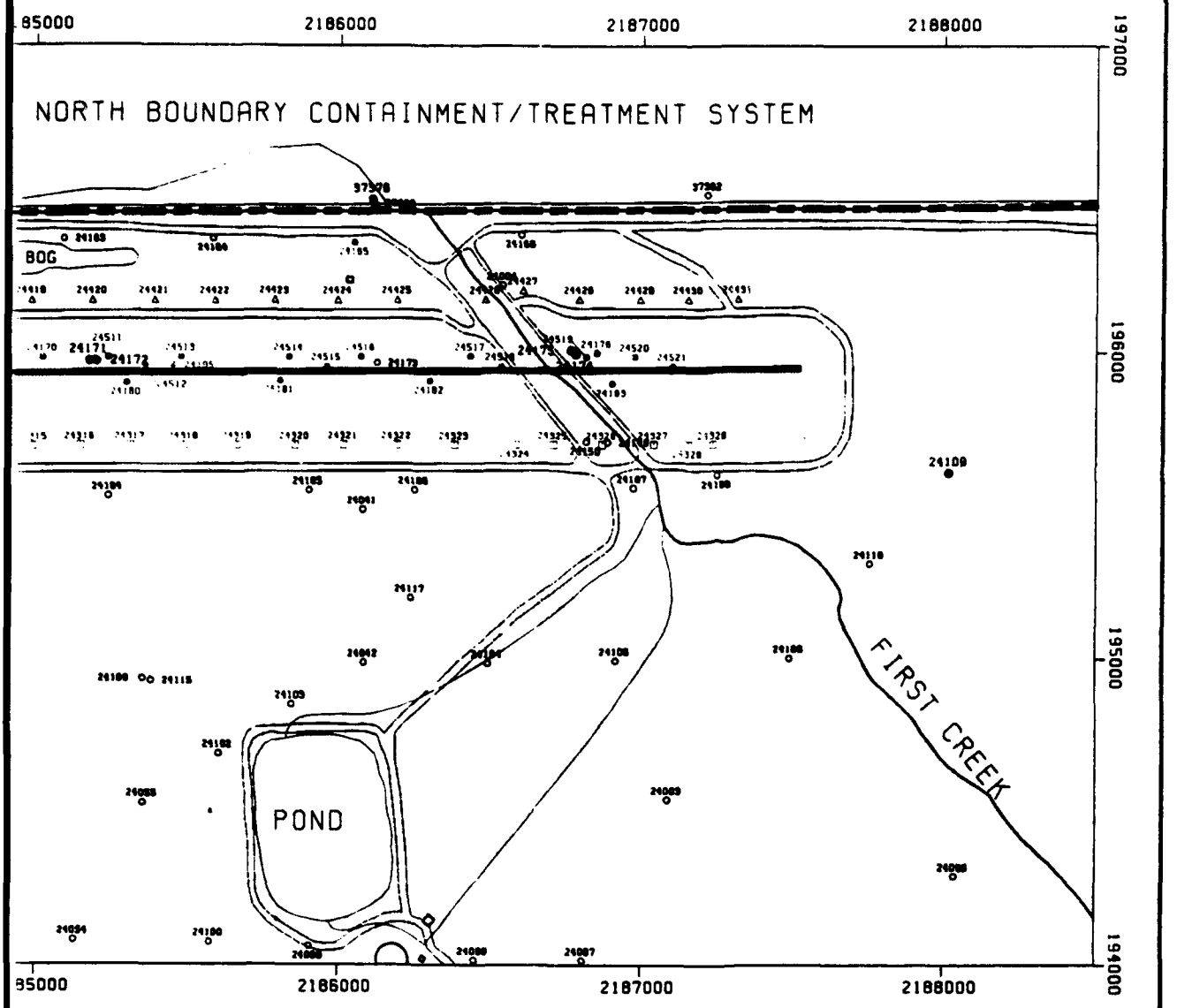

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System Flow Quantities

12. The volume of water treated by the NBS is recorded on a daily basis. The flow quantities recorded for FY89 are presented in tables in Appendix A of this report. Graphs of weekly flow rates for each adsorber and the effluent stream have been prepared and are presented in Figures 2 through 5. The treatment plant flow data were gathered on a weekly (7 day) basis beginning with the first day of the FY through the end of the FY.

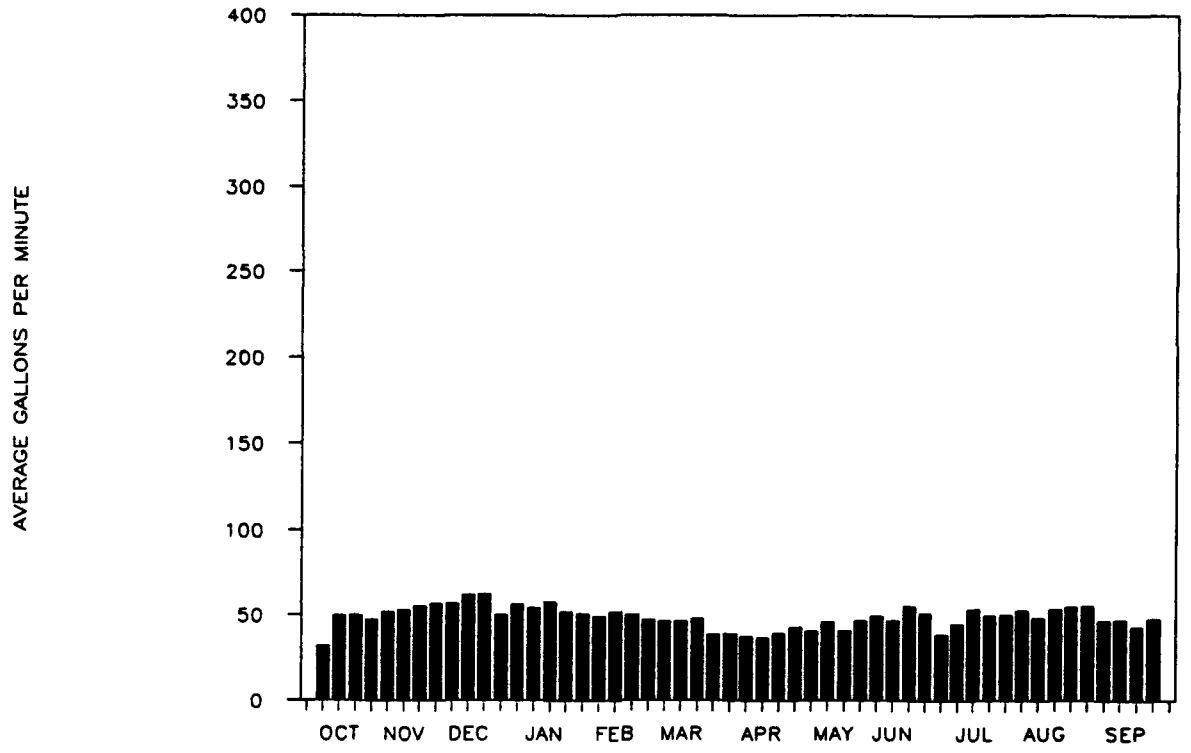
13. During FY89, total flow (effluent) rates ranged from a low of 181 gpm to a high of approximately 312 gpm. Average flow rates and total gallons of water treated during FY89 are presented in Table 3. The total volume treated in FY89 was approximately 6.9 million gallons greater than that treated in FY88. The average flow rate in FY89 was approximately 18.7 gpm greater than that for FY88.

Table 3

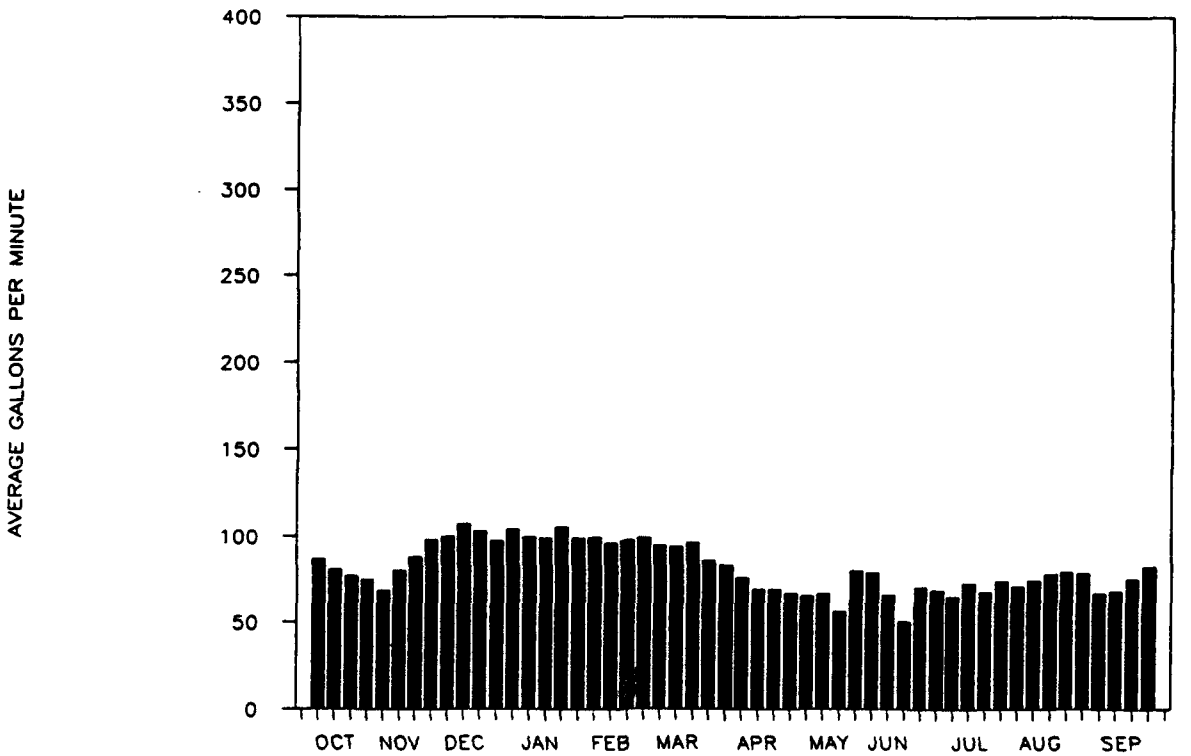
FY 89 System Flow Quantities

Adsorber	Average Flow Rate (gpm)	Total Volume Treated (gal)
A	48.85	25,672,900
B	81.86	43,024,900
C	123.87	65,112,100
Total Effluent	254.57	133,809,900

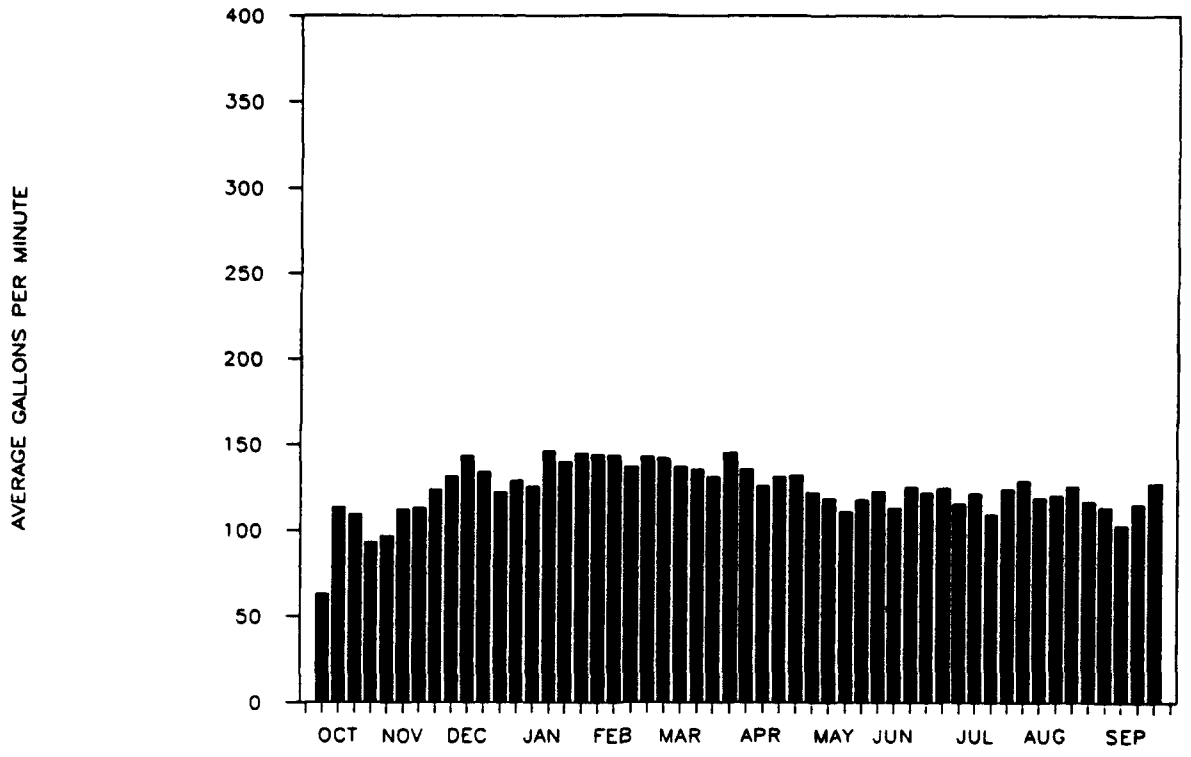
FY 89 – ADSORBER A



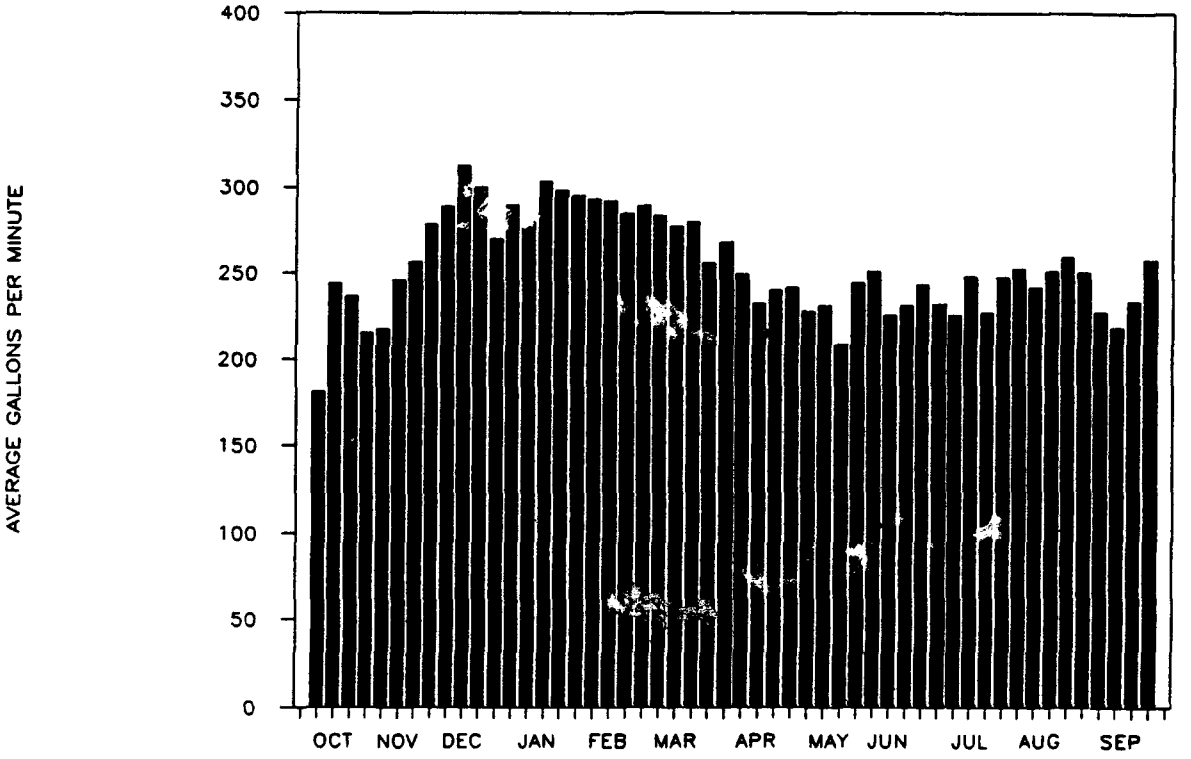
FY 89 – ADSORBER B



FY 89 – ADSORBER C



FY 89 – NB EFFLUENT



System Influent and Effluent Water Quality

14. The quality of the influent water and effluent water from the treatment system is monitored periodically by taking grab samples and analyzing them. Influent water samples are collected from each of the three individual adsorber treatment units in order to determine the quality of water flowing to each adsorber. A combined effluent sample is collected to determine overall effluent quality.

15. The influent and effluent water samples were analyzed for the analytes listed in Table 1 of this report. A statistical summary of the chemical analyses for the period October 1988 through September 1989 are presented in tabular form in Appendix B of this report. The statistical summary includes for each analyte the total number of samples analyzed, the certified reporting limit (CRL), the number of samples with concentrations above the CRL, the percent samples with concentrations above the CRL, the method number, the unit of measurement, the mean concentration, the low concentration, and the high concentration.

16. Graphs of the concentrations found for aldrin, chloride, combined organo-sulfurs, DBCP, DCPD, DIMP, dithiane, dieldrin, endrin, fluoride, isodrin, oxathiane, sulfate, trichloroethylene, 1,2-dichloroethane, 1,3-dimethylbenzene, bicycloheptadiene, chloroform, hexachlorocyclopentadiene, toluene, malathion, p,p'-DDT, parathion, supona, tetrachloroethylene, and xylene over this period have been prepared and are presented in Figures 6 through 32. No concentrations of the other organic contaminants listed in Table 1 in excess of their respective certified reporting limit (CRL) were found in the samples collected during FY89 and therefore, no graphs were prepared for these contaminants.

17. A separate graph has been prepared for each contaminant for each adsorber influent and plant effluent for FY89. Each graph (except where noted) presents a plot of the contaminant concentrations found and three lines indicating the CRL, the maximum operating limit (MOL) permitted, and the average concentration over the FY where sufficient data were available to calculate an average. The MOL used in this report is defined as the water quality criterion against which the operating performance of the treatment plant is compared in order to assess treatment effectiveness for the various contaminants of concern. A list of the MOL's used during the FY89 operational assessment is presented in Table 4. An average concentration was only

Table 4

Maximum Operating Limits for North Boundary System

Parameter	Maximum Operating Limit (MOL)	Source*
Aldrin	0.2 $\mu g/\ell$	Guidance from OTSG (Army) until standards are developed.
Chloride	N.A.	EPA Secondary Drinking Water Regulation standard is 250 mg/ℓ
Dibromochloropropan (DBCP)	0.2 $\mu g/\ell$	State of Colorado Department of Health limit per letter to Commander, RMA, 26 June 79.
Dicyclopentadiene (DCPD)	24.0 $\mu g/\ell$	The State of Colorado has requested the Army to meet a limit of 24 $\mu g/\ell$ for DCPD based on an odor threshold value.
Diisopropylmethyl-phosphonate (DIMP)	500 $\mu g/\ell$**	These criteria are recommended by the US Medical Bioengineering Research and Development Lab (26 Aug 76) and are based on toxicology studies (26 Aug 76) conducted by the Army. The National Academy of Sciences Committee on Military Environmental Research has reviewed the procedures and results of toxicology studies and concurred in the drinking water levels (1 Feb 77).
Dieldrin	0.2 $\mu g/\ell$	Guidance from OTSG (Army) until standards are developed.
Endrin	0.2 $\mu g/\ell$	EPA National Primary Drinking Water Regulation.
Fluoride	N.A.	EPA final Rule on Fluoride, National Primary and Secondary Drinking Water Standards, 40 CFR Parts 141, 142, and 143, maximum concentration limit is 4.0 mg/ℓ.
Combined Organo-Sulfurs	100 $\mu g/\ell$	Guidance from OTSG (Army) until standards are developed.

N.A. = Not Applicable

* Source: After Rocky Mountain Arsenal Contamination Control Program Management Team (1983)

** The Environmental Protection Agency's Office of Drinking Water Washington, D.C. issued a health advisory in December 1988 for DIMP not to exceed 600 $\mu g/\ell$.

computed for sets of data where 70 percent or more of the readings were above the CRL. When the criterion was met, values falling below the CRL were made equal to the CRL and included in the computations.

18. As discussed by Thompson et al. (1985), each of the three sumps (wet-wells) at the treatment plant (one for each manifold) were to feed an individual adsorber under the original operating scenario. Under this mode of operation, the influent to a particular adsorber would generally contain a higher concentration of a particular contaminant than would the others, since the contaminants are not evenly distributed along the length of the barrier. Operational changes and occasional mechanical problems have resulted in a requirement to periodically distribute water from individual sumps to more than one adsorber. This action has resulted in fluctuations in the concentrations of the various contaminants in the influent to each adsorber. Thus, conclusions concerning the increase or decrease in concentrations of contaminants in ground water along the three sections of the barrier should not be drawn based on the influent concentration data presented herein.

Aldrin

19. The CRL for aldrin (Figure 6) in FY89 was 0.05 ppb. The MOL for the NBS treatment plant was 0.2 ppb. Concentrations of aldrin ranging from less than the CRL to approximately 5.4 ppb were found in the 49 samples of influent to adsorber A collected during FY89. Much lower concentrations of aldrin were found in the influent to adsorber B with only one sample found to have a concentration slightly above the MOL. Only one sample of the influent to adsorber C had a concentration in excess of the CRL, however, that concentration was less than the MOL. No concentrations of aldrin above the CRL were found in the treatment plant effluent during the year.

Chloride

20. The CRL for chloride (Figure 7) was not reported. No MOL has been established. Based on 51 samples, the average chloride concentrations in the influents to adsorbers A, B, and C were 835 ppm, 132 ppm, and 97 ppm, respectively. The average concentration in the plant effluent over the year was 258 ppm. Chloride is not removed from the ground water by the NBS treatment plant.

Combined Organo-Sulfurs

21. The CRL for the combined organo-sulfurs (Figure 8) in FY89 was 24.65 ppb. The MOL for the NBS treatment plant was 100 ppb. Of 51 samples collected, the total concentrations of the combined organo-sulfurs found in

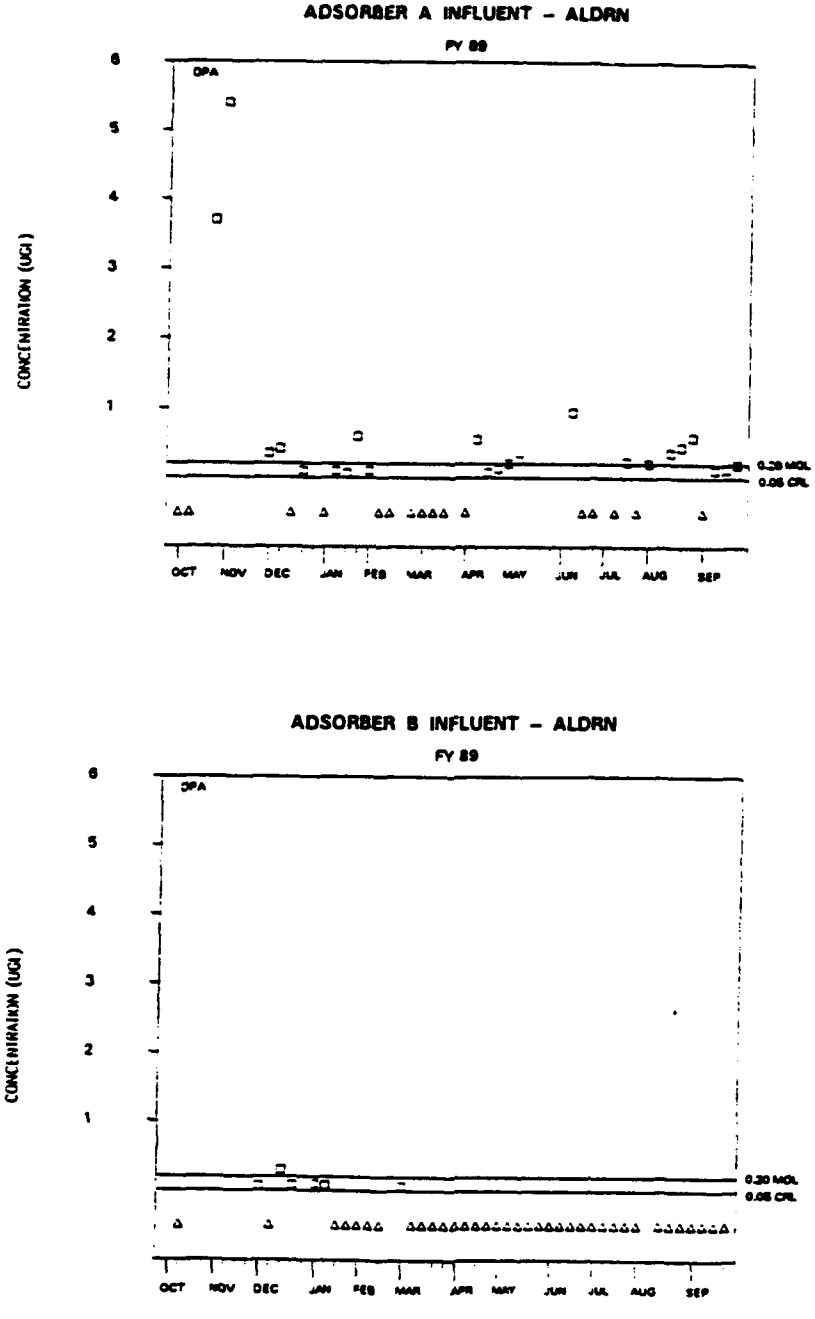


Figure 6. FY89 Aldrin (Continued)

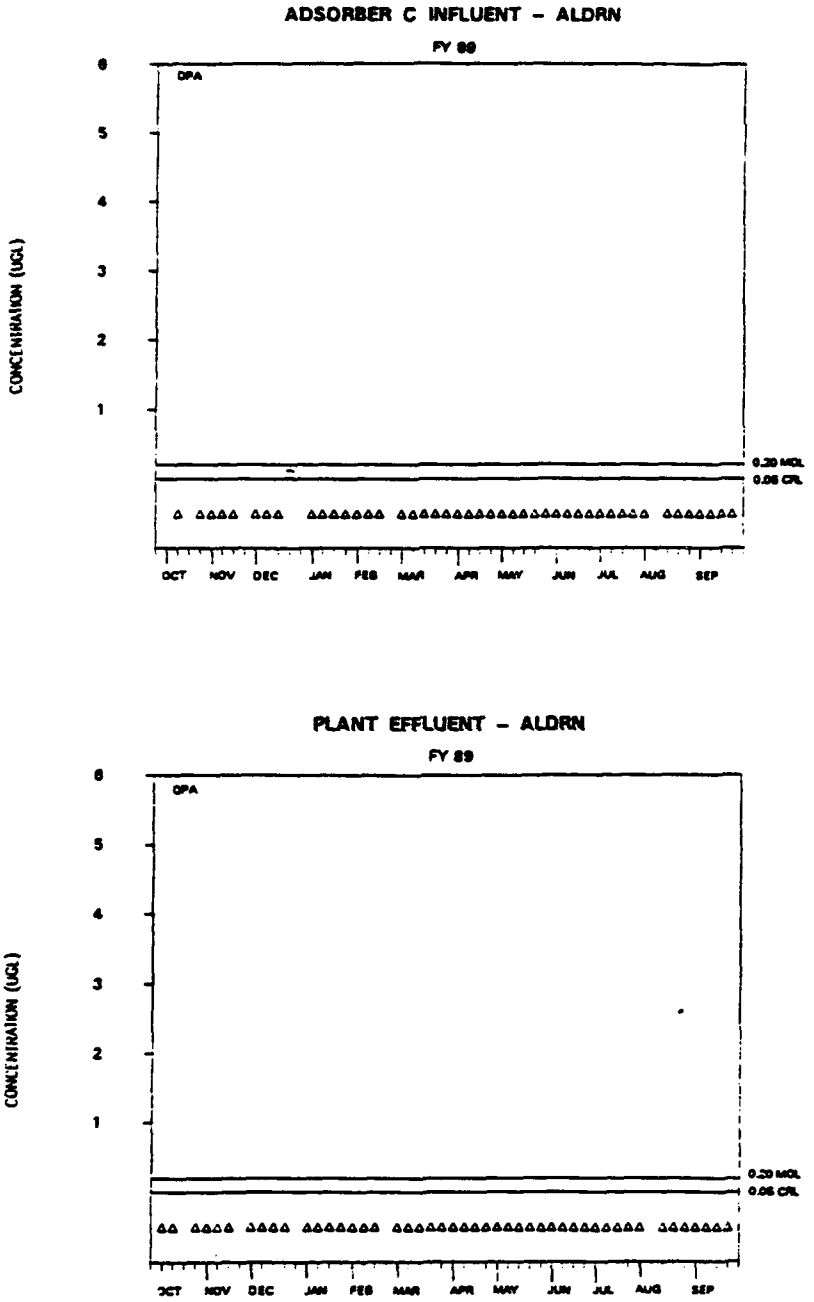
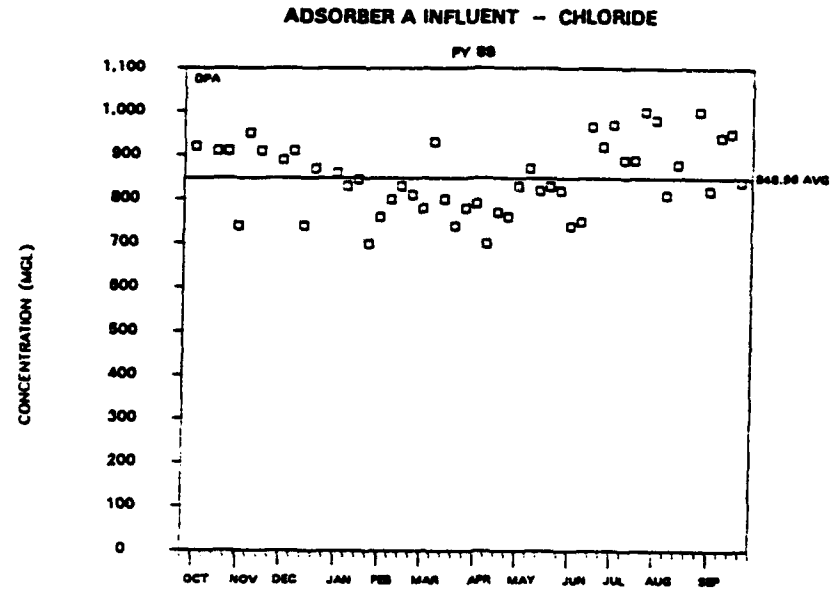


Figure 6. FY89 Aldrin (Concluded)



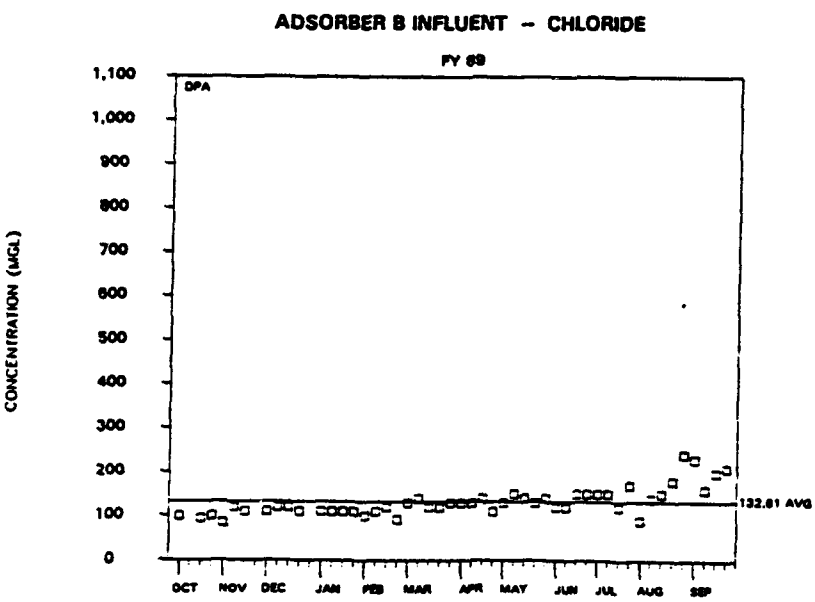


Figure 7. FY89 Chloride concentrations (Continued)

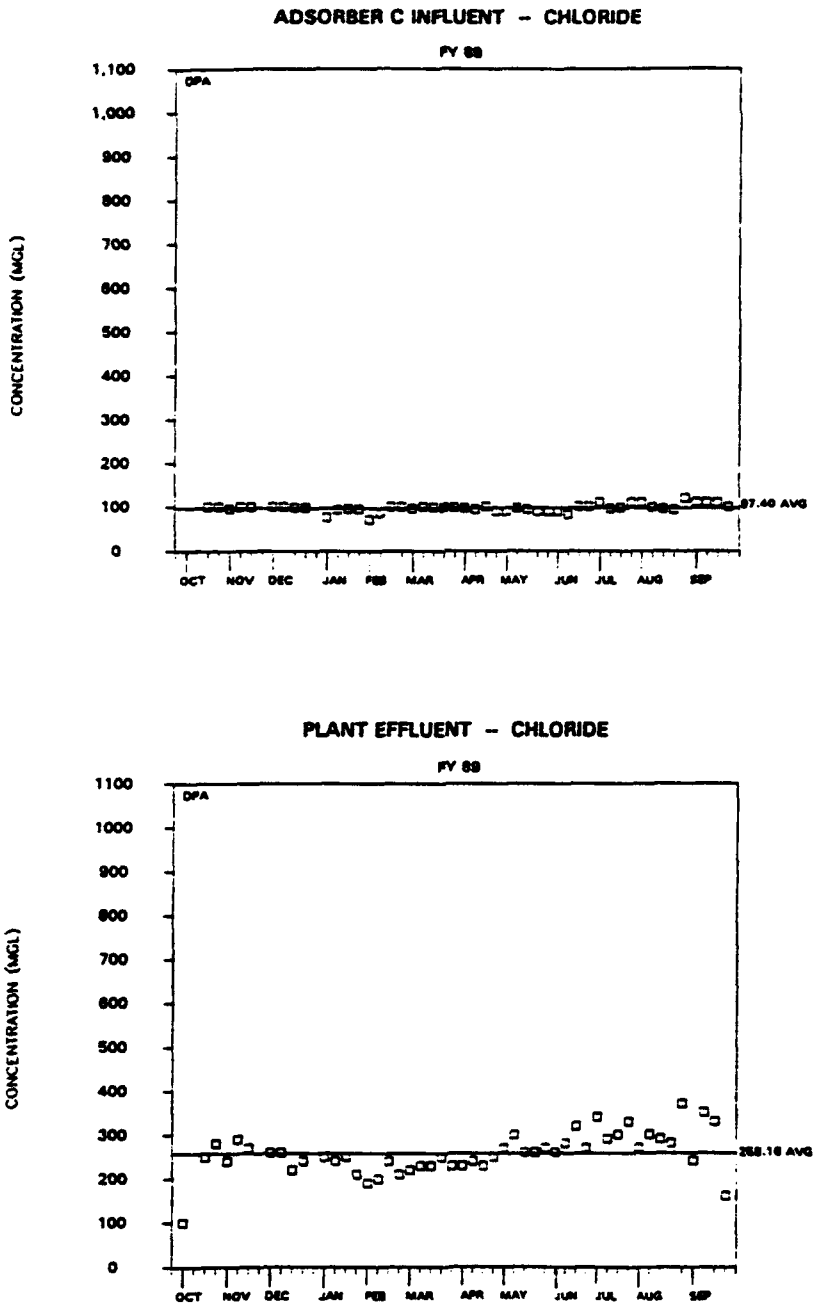


Figure 7. FY89 Chloride concentration (Concluded)

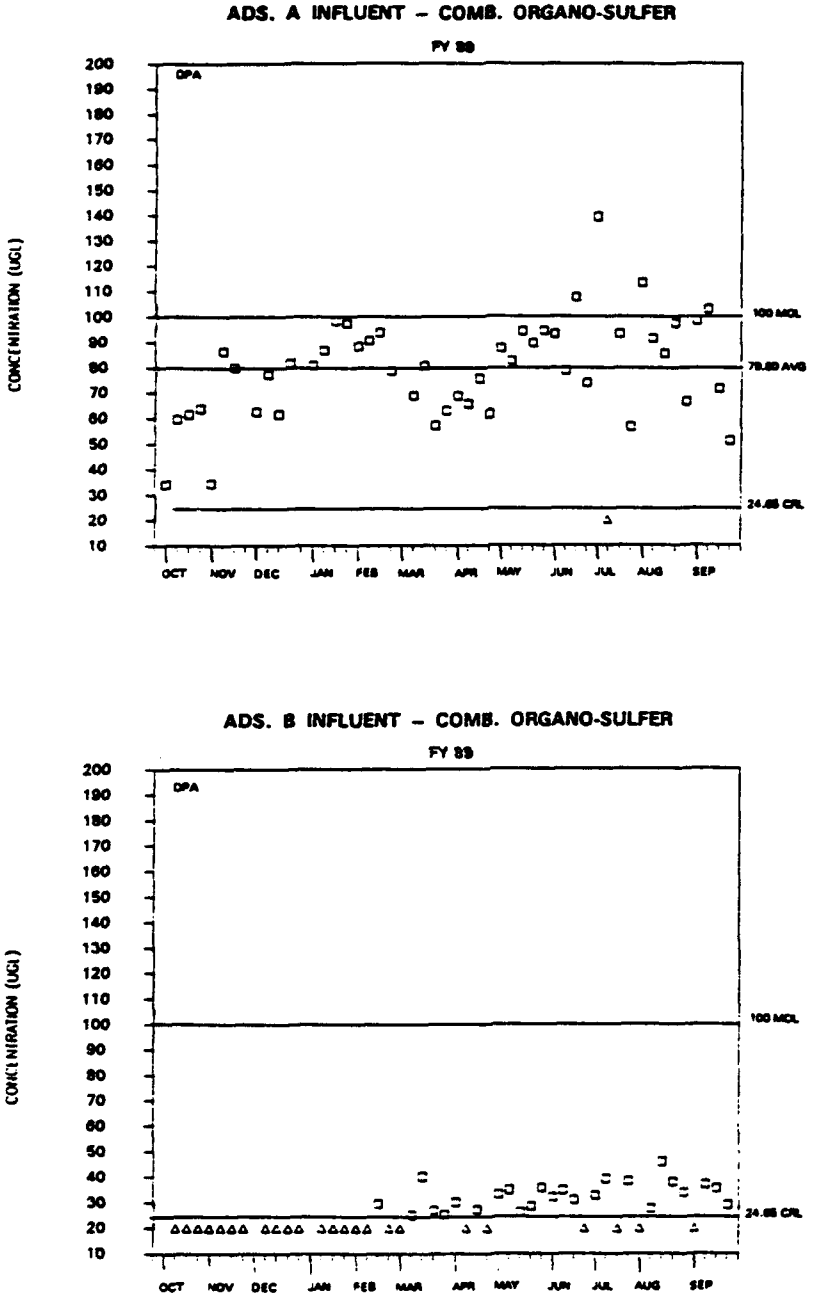


Figure 8. FY89 Combined Organo-Sulfurs concentration (Continued)

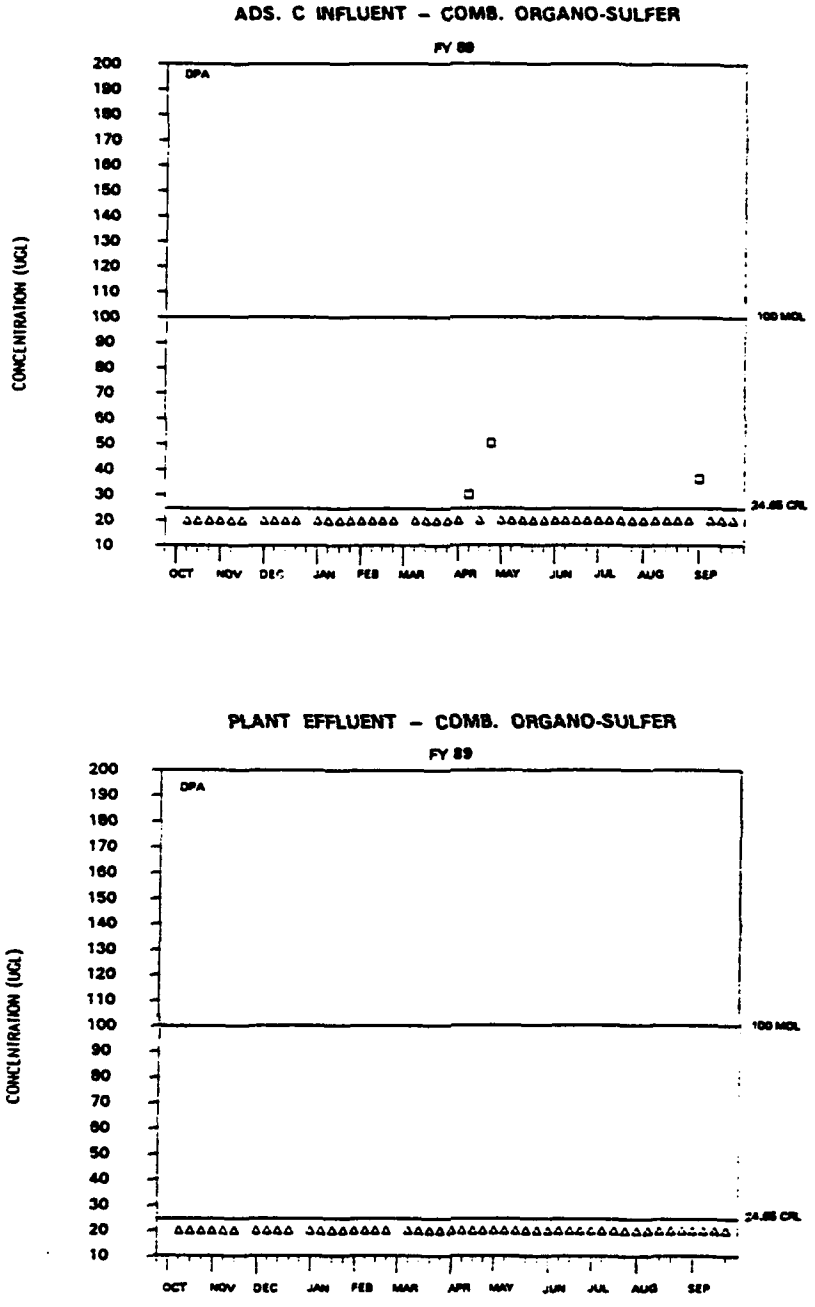


Figure 8. FY89 Combined Organo-Sulfurs concentration (Concluded)

the influent to adsorber A ranged from less than the CRL to approximately 140 ppb with an average of 79.6 ppb. Influent samples from adsorber B were found to contain concentrations from below the CRL to a maximum of approximately 48 ppb. Only a few samples of influent to adsorber C were found to have organo-sulfur concentrations in excess of the CRL with none of them above the MOL. No concentrations above the CRL were found in any of the effluent samples.

DBCP

22. The CRL for DBCP (Figure 9) in FY89 was 0.2 ppb as was the MOL. The concentrations of DBCP found in the influent to adsorber A ranged from below the CRL to approximately 1.3 ppb. The average concentration in the 49 samples was 0.8 ppb. Concentrations in the influent to adsorber B were found to range from below the CRL to approximately 0.85 ppb with an average for the year of 0.5 ppb. No concentrations of DBCP above the CRL were found in the influent samples to adsorber C or in the effluent samples from the plant.

DCPD

23. The CRL for DCPD (Figure 10) in FY89 was 5.0 ppb. The MOL for the NBS treatment plant was 24 ppb. The concentrations of DCPD found in the influent to adsorber A ranged from approximately 200 ppb to 500 ppb with an average for the 47 samples analyzed for 341 ppb. Concentrations in the influent to adsorber B were found to range from below the CRL to approximately 52 ppb with an average for the year of 19.6 ppb. No concentrations of DCPD above the CRL were found in the influent samples to adsorber C or in the effluent samples from the plant.

DIMP

24. The CRL for DIMP (Figure 11) in FY89 was 0.65 ppb and the MOL for the treatment plant was 500 ppb. The concentrations of DIMP in the influent to adsorber A ranged from less than 100 ppb to approximately 1100 ppb with an average for the year of 789 ppb based on 49 samples. The concentrations found in the influent to adsorber B ranged from less than 10 ppb to approximately 190 ppb with an average of 88 ppb. The concentrations found in the influent to adsorber C ranged from approximately 2.5 ppb to 9 ppb with an average of 5.2 ppb. Concentrations of DIMP in the plant effluent were generally less than 6 ppb. The average for the year was 2.4 ppb. In July, 1989, a concentration of 390 ppb was reported in an effluent sample. This value was not plotted or included in the calculations of the yearly average because it was

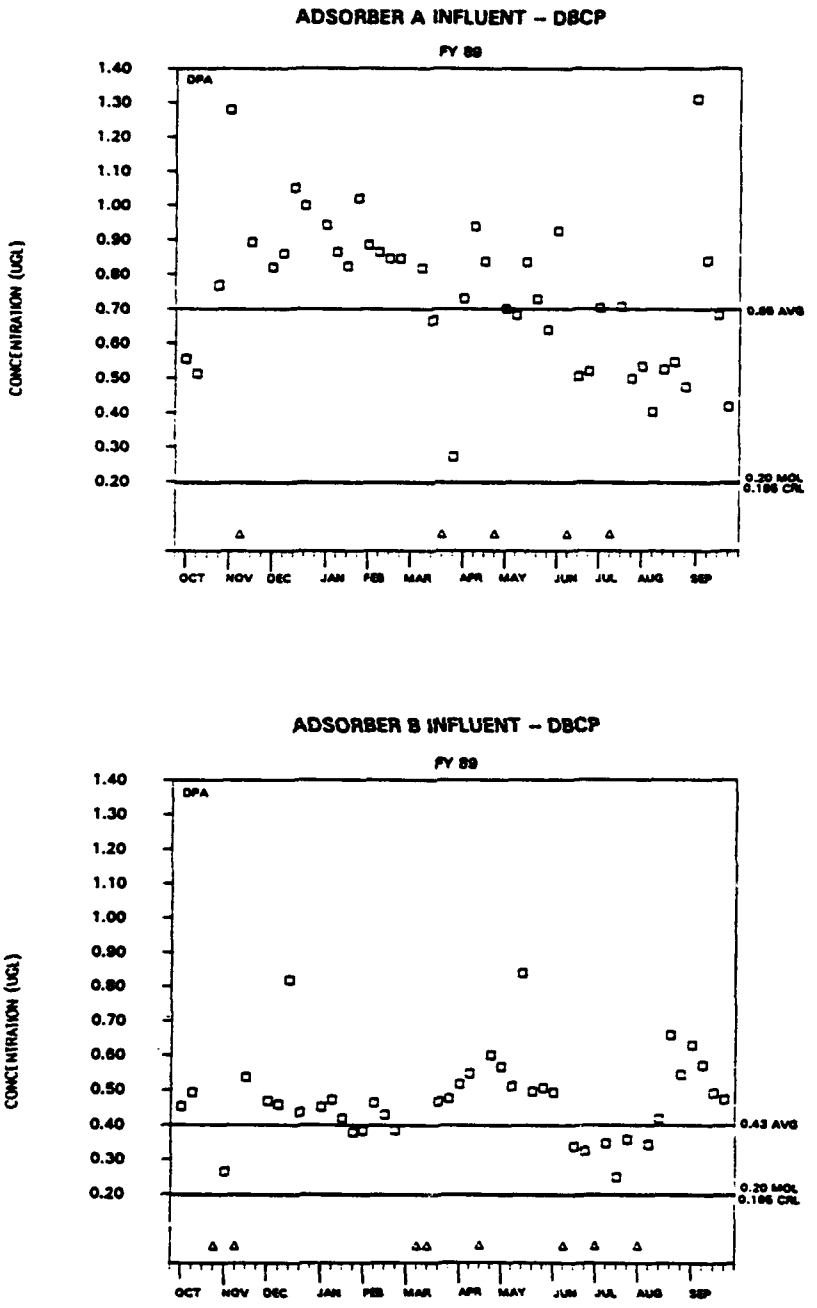


Figure 9. FY89 Dibromochloropropane concentrations (Continued)

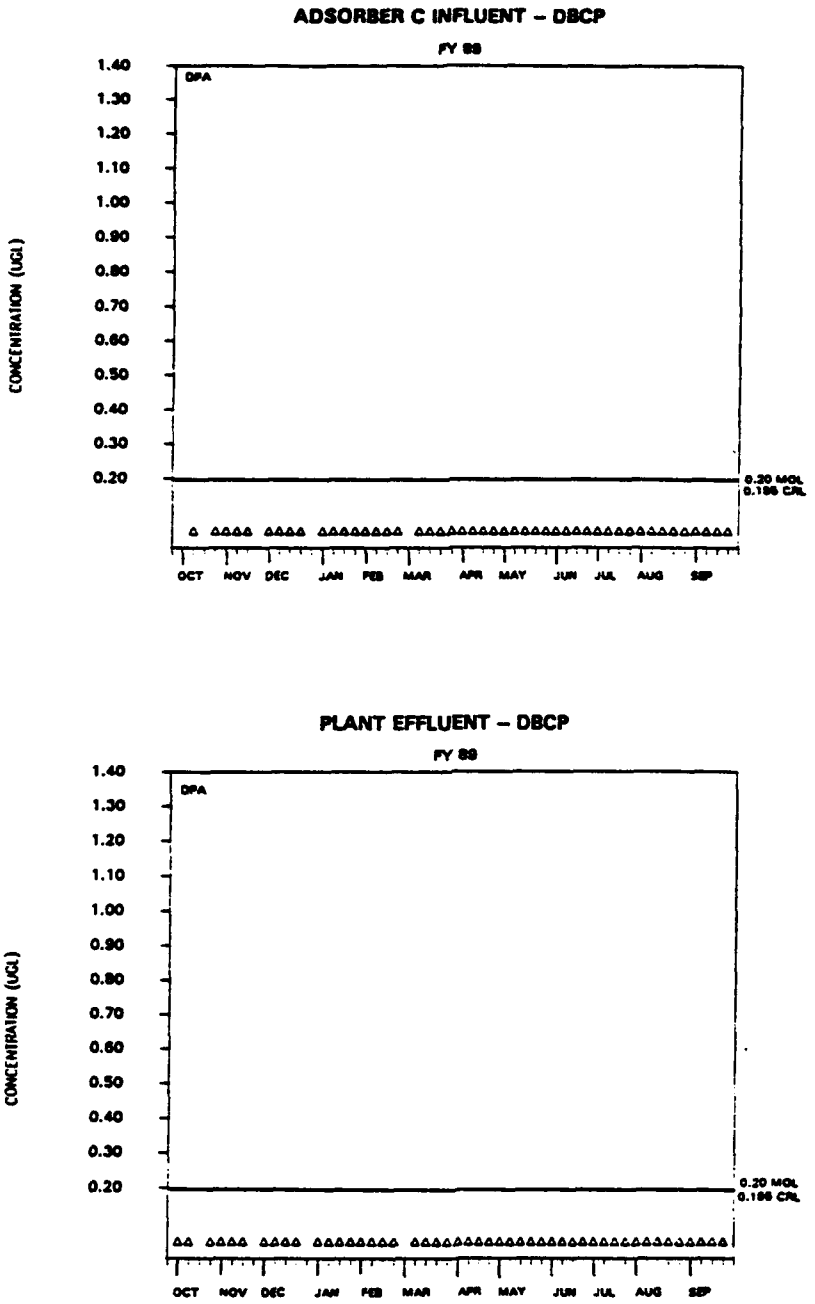


Figure 9. FY89 Dibromochloropropane concentrations (Concluded)

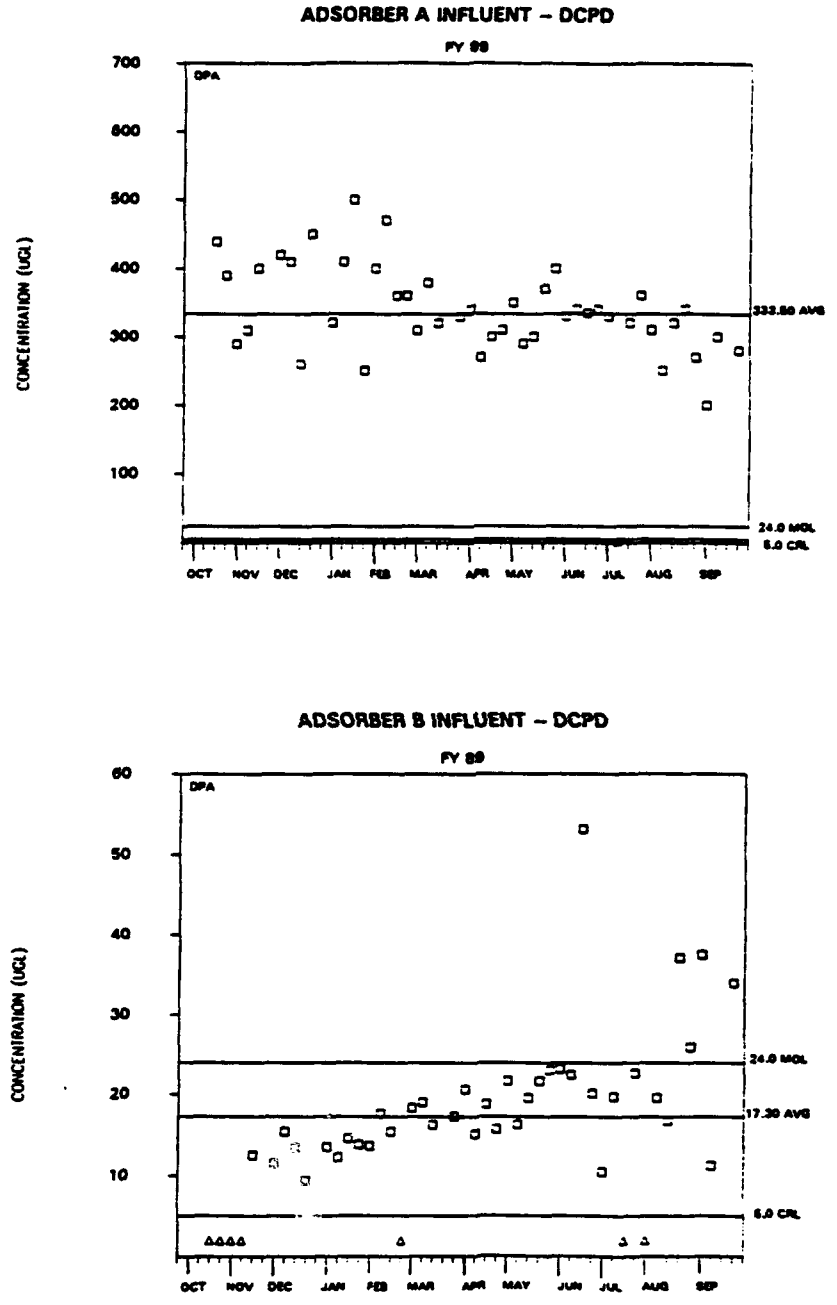


Figure 10. FY89 Dicyclopentadiene concentrations (Continued)

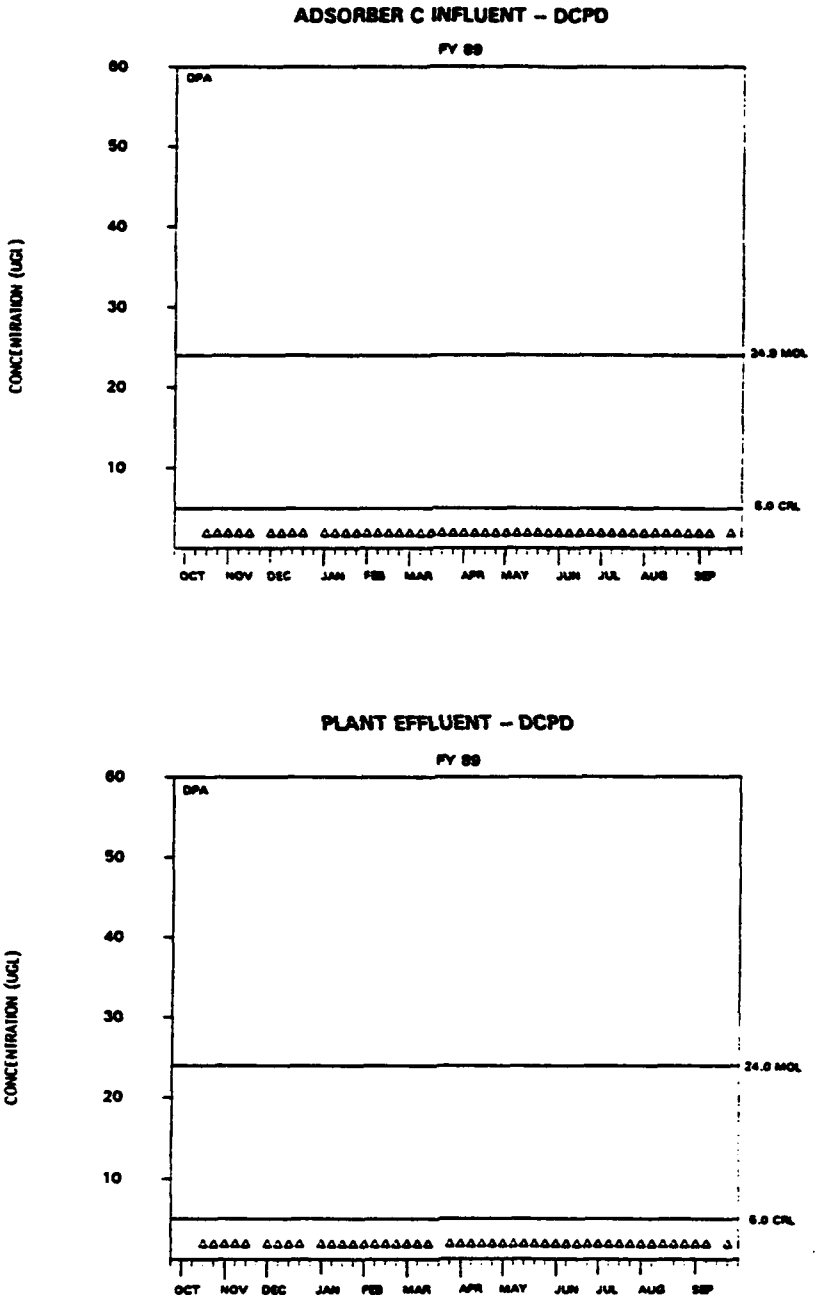


Figure 10. FY89 Dicyclopentadiene concentration (Concluded)

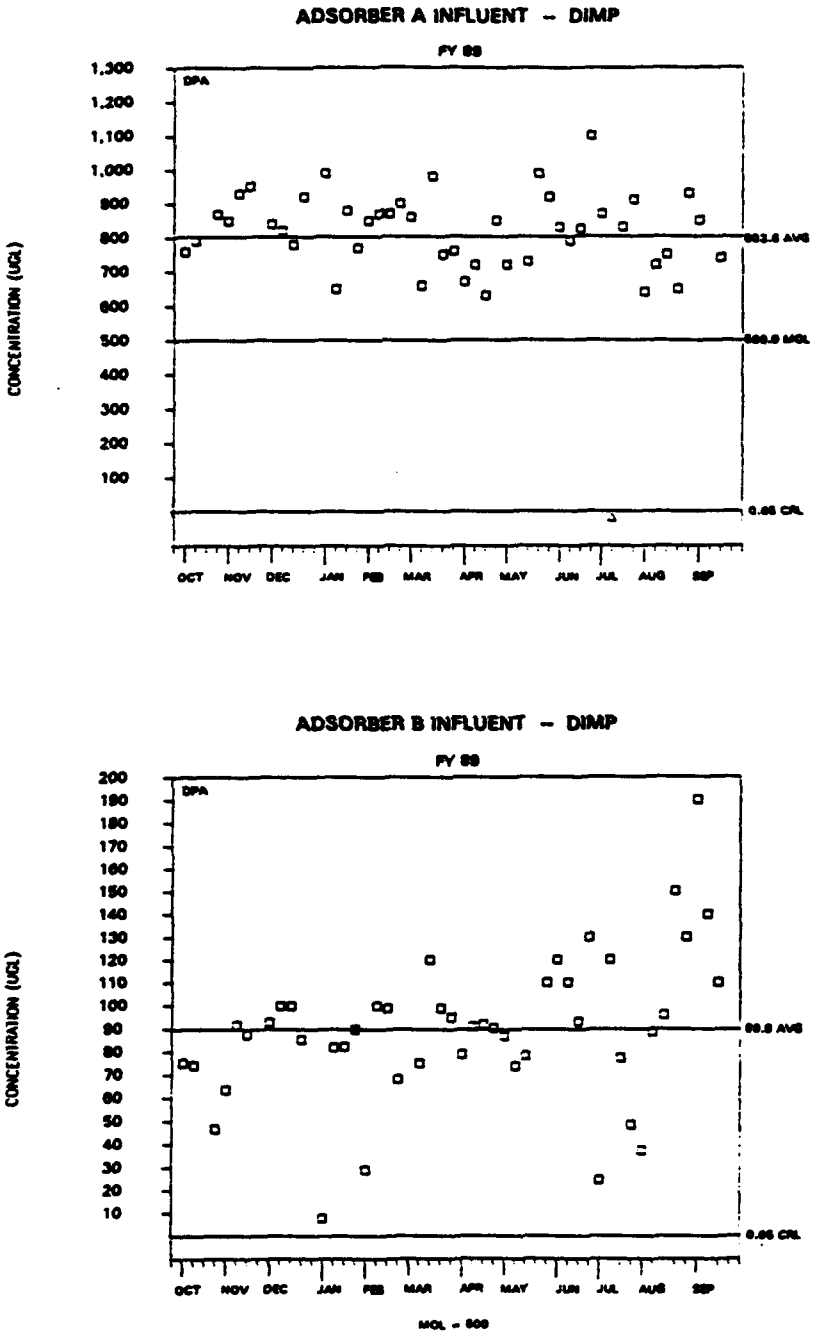


Figure 11. FY89 Diisopropylmethylphosphonate concentrations (Continued)

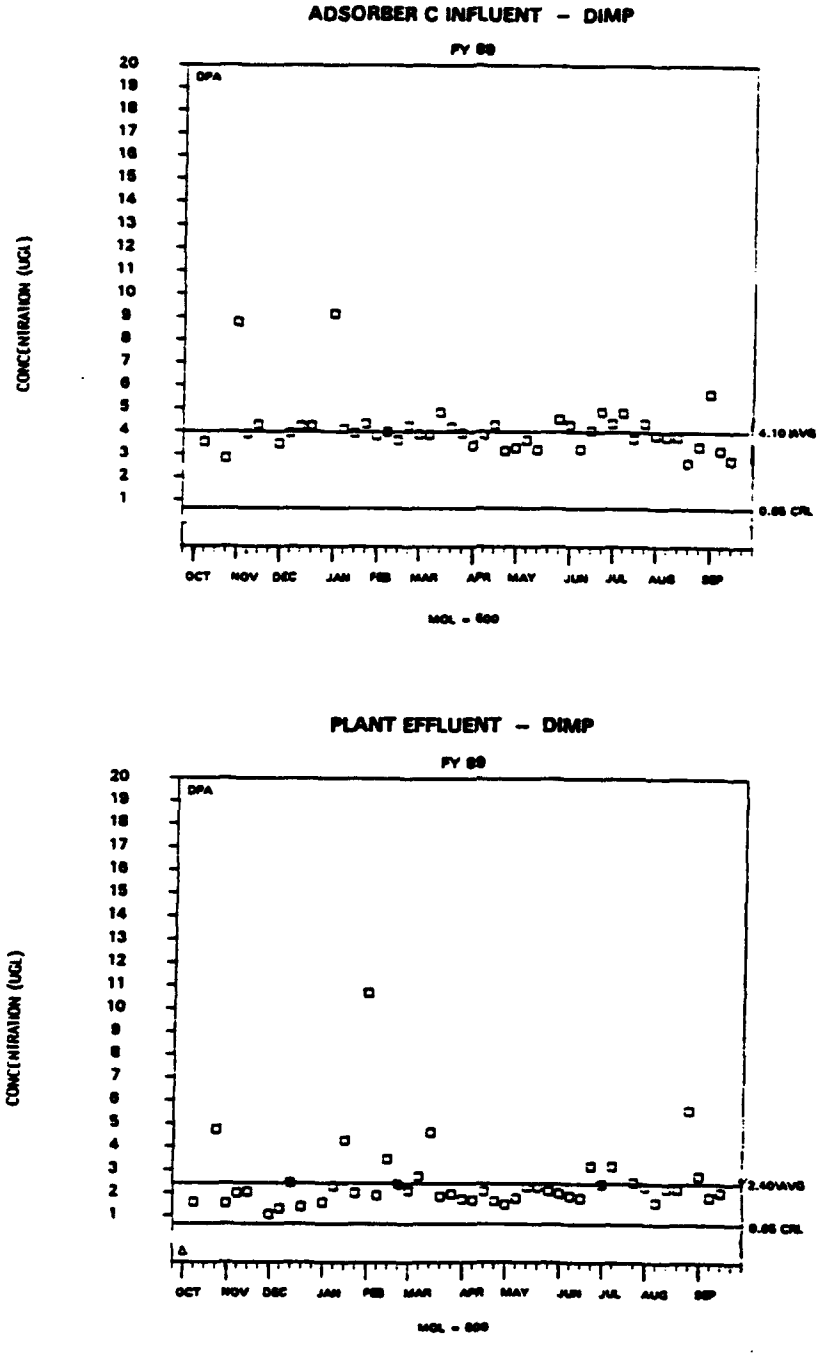


Figure 11. FY89 Diisopropylmethylphosphonate concentrations (Concluded)

considered an anamalous value. Concentrations reported in samples collected before and after this sample were in the range of the average and thus it is unlikely that a sample concentration of 390 ppb is representative of the DIMP concentrations in the plant effluent during this time.

Dithiane

25. The CRL for dithiane (Figure 12) in FY89 was 1.34 ppb. No MOL has been established. Samples of the influent to adsorber A were found to contain dithiane from below the CRL to a maximum concentration of approximately 29 ppb. The average concentration for the year based on 49 samples was 20.7 ppb. Approximately 20 percent of the influent samples to adsorber B contained dithiane above the CRL with a maximum concentration of approximately 9 ppb found. Only three samples of influent to adsorber C were found to contain dithiane in excess of the CRL with a maximum concentration of 20 ppb. None of the effluent samples from the treatment plant contained dithiane in concentrations above the CRL.

Dieldrin

26. The CRL for dieldrin (Figure 13) in FY89 was 0.05 ppb. The MOL for the NBS treatment plant was 0.2 ppb. The concentrations of dieldrin found in the influent to adsorber A ranged from less than the CRL to approximately 3.1 ppb. The average concentration for the year based on 50 samples was 22 ppb. The highest concentration found in the influent to adsorber B was approximately 5 ppb with an average for the year of 0.8 ppb. The highest dieldrin concentration found in the influent to adsorber C was approximately 1 ppb with an average for the year of 0.1 ppb. A single sample of treatment plant effluent was found to have a dieldrin concentration in excess of the CRL at 0.4 ppb. The concentrations in all the other samples were below the CRL.

Endrin

27. The CRL for endrin (Figure 14) in FY89 was 0.05 ppb. The MOL for the NBS treatment plant was 0.2 ppb. Concentrations of endrin ranging from less than the CRL to approximately 4.5 ppb and 5.9 ppb were found in the influent to adsorber A and adsorber B, respectively, during FY89. The average concentration for adsorber A was 0.8 ppb while the average found in the influent to adsorber B was 0.9 ppb. The maximum concentration in the influent to adsorber C was 0.2 ppb while no concentrations of endrin above the CRL were found in the effluent samples over the year.

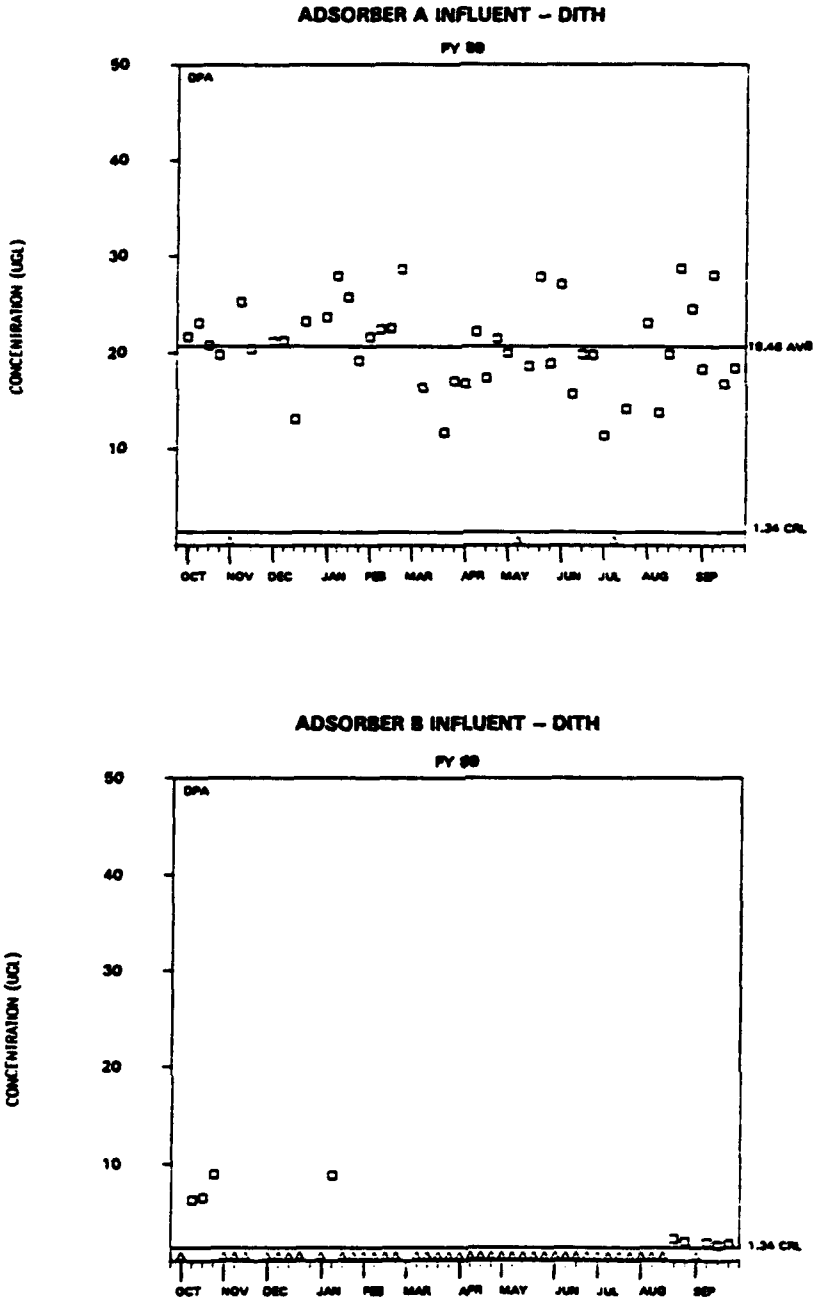


Figure 12. FY89 Dithiane concentrations (Continued)

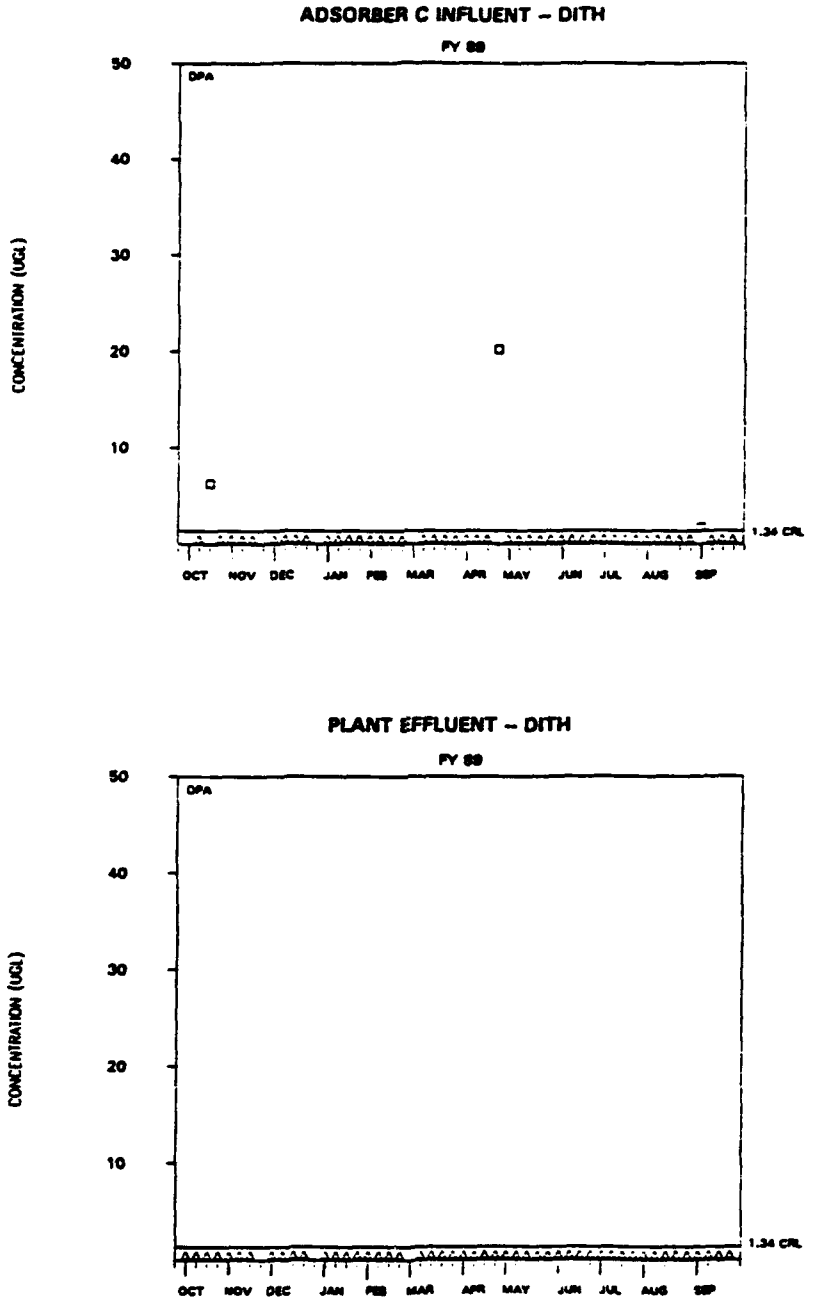


Figure 12. FY89 Dithiane concentrations (Concluded)

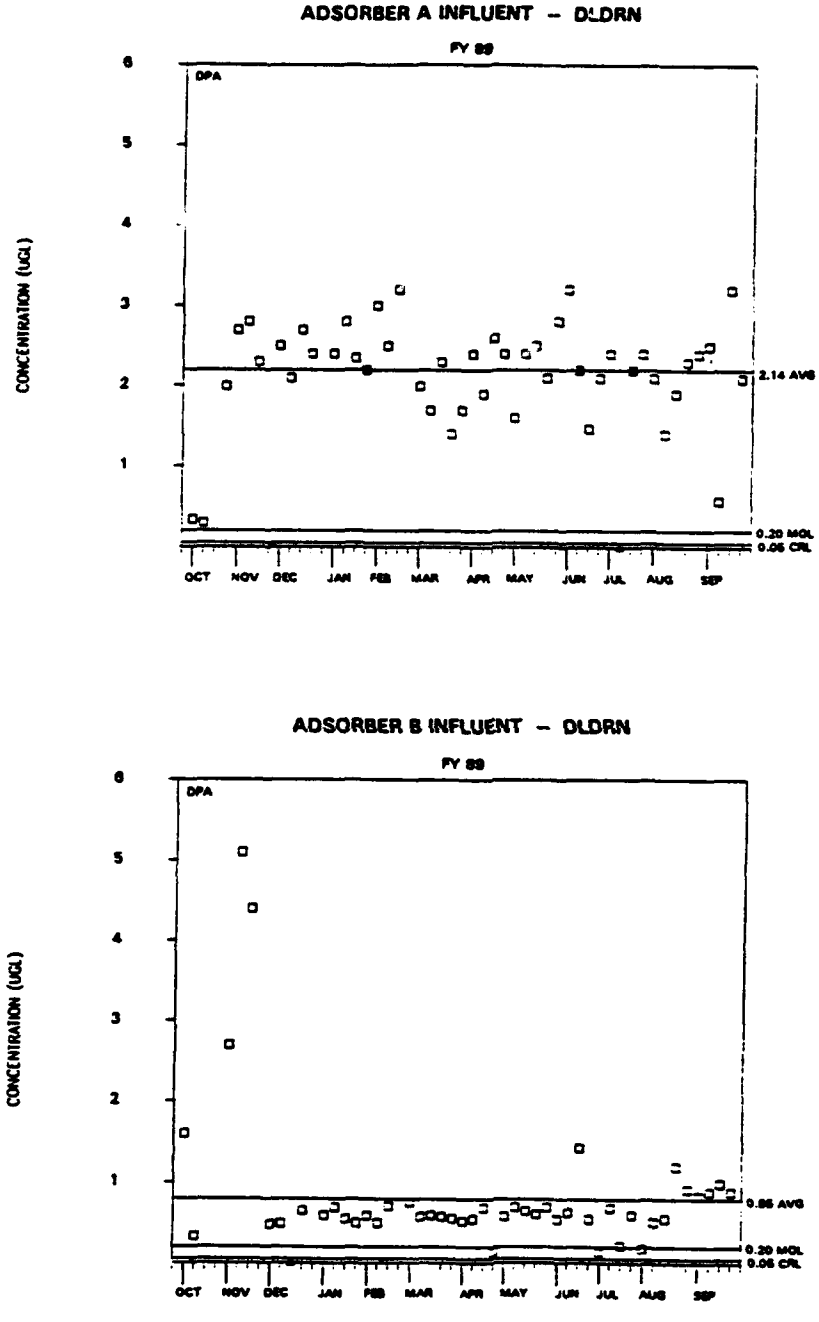


Figure 13. FY89 Dieldrin concentration (Continued)

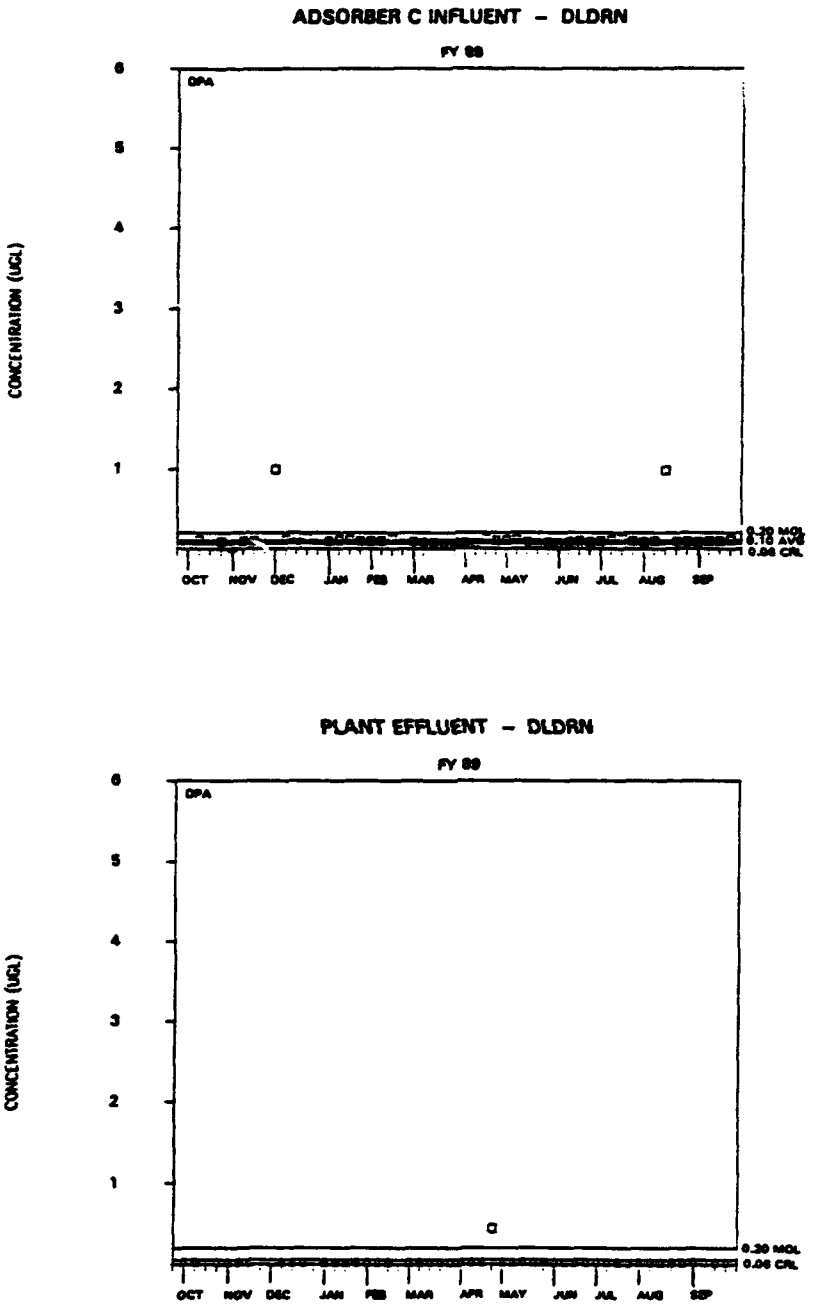


Figure 13. FY89 Dieldrin concentrations (Concluded)

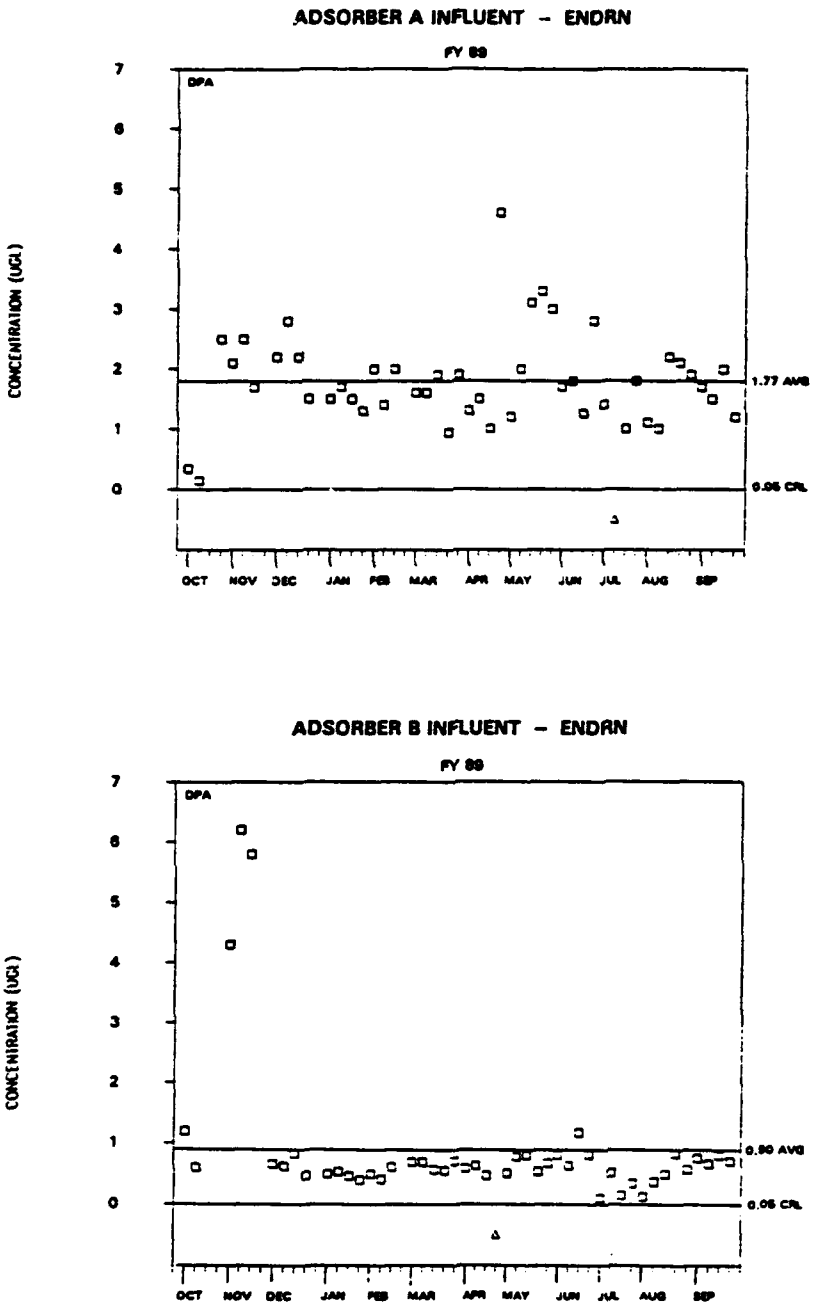


Figure 14. FY89 Endrin concentrations (Continued)

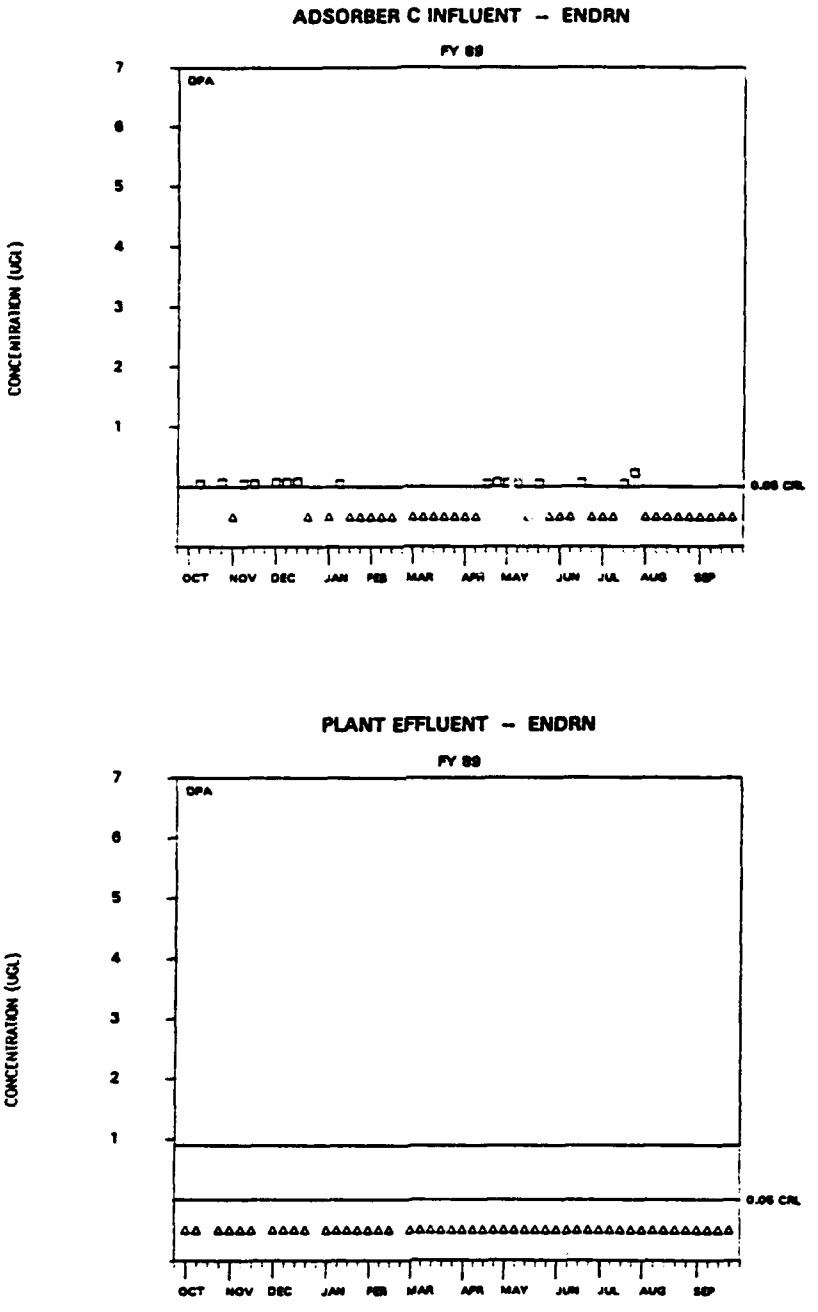


Figure 14. FY89 Endrin (Concluded)

Fluoride

28. The CRL for fluoride (Figure 15) was not reported. No MOL has been established. The average fluoride concentration in the influent to adsorber A was 5.9 ppm based on 51 samples with a high concentration of approximately 10 ppm. The average concentrations in the influents to adsorber B and adsorber C were 3.2 ppm and 2.3 ppm, respectively. The average concentration in the plant effluent was 3.2 ppm over the year. Fluoride is not removed from the ground water by the activated carbon treatment system.

Isodrin

29. The CRL for isodrin (Figure 16) in FY89 was 0.051 ppb. No MOL has been established. The concentrations of isodrin in the influent to adsorber A collected over the year ranged from less than the CRL to a high of approximately 1 ppb. A total of 50 samples were analyzed. Approximately 20 percent of the samples collected from the influent to adsorber B contained isodrin in excess of the CRL with a maximum concentration found of approximately 0.31 ppb. Only one sample of influent to adsorber C had an isodrin concentration in excess of the CRL at approximately 0.32 ppb. No concentrations of isodrin above the CRL were found in the plant effluent samples over the year.

Oxathiane

30. The CRL for oxathiane (Figure 17) in FY89 was 2.38 ppb. No MOL has been established. The concentrations of oxathiane in the influent to adsorber A ranged from below the CRL to a high of approximately 8 ppb. The average for the year was 4.7 ppb based on 51 samples. No concentrations of oxathiane above the CRL were found in the influent to adsorber B or in the plant effluent. A single sample of influent to adsorber C had an oxathiane concentration in excess of the CRL at approximately 5 ppb.

Sulfate

31. The CRL for sulfate (Figure 18) was not reported. No MOL has been established. Only two samples were collected from the three influent and the plant effluent streams during the year. The average concentrations in the influents to adsorbers A, B, and C were 320 ppm, 470 ppm, and 390 ppm, respectively. The average concentration in the plant effluent was 395 ppm. Sulfate is not removed from the ground water by the activated carbon treatment system.

Trichloroethylene

32. The CRL for trichloroethylene (Figure 19) in FY89 was 0.56 ppb. No MOL has been established. The concentrations of trichloroethylene in the influent to adsorber A ranged from below the CRL to a maximum of approximately

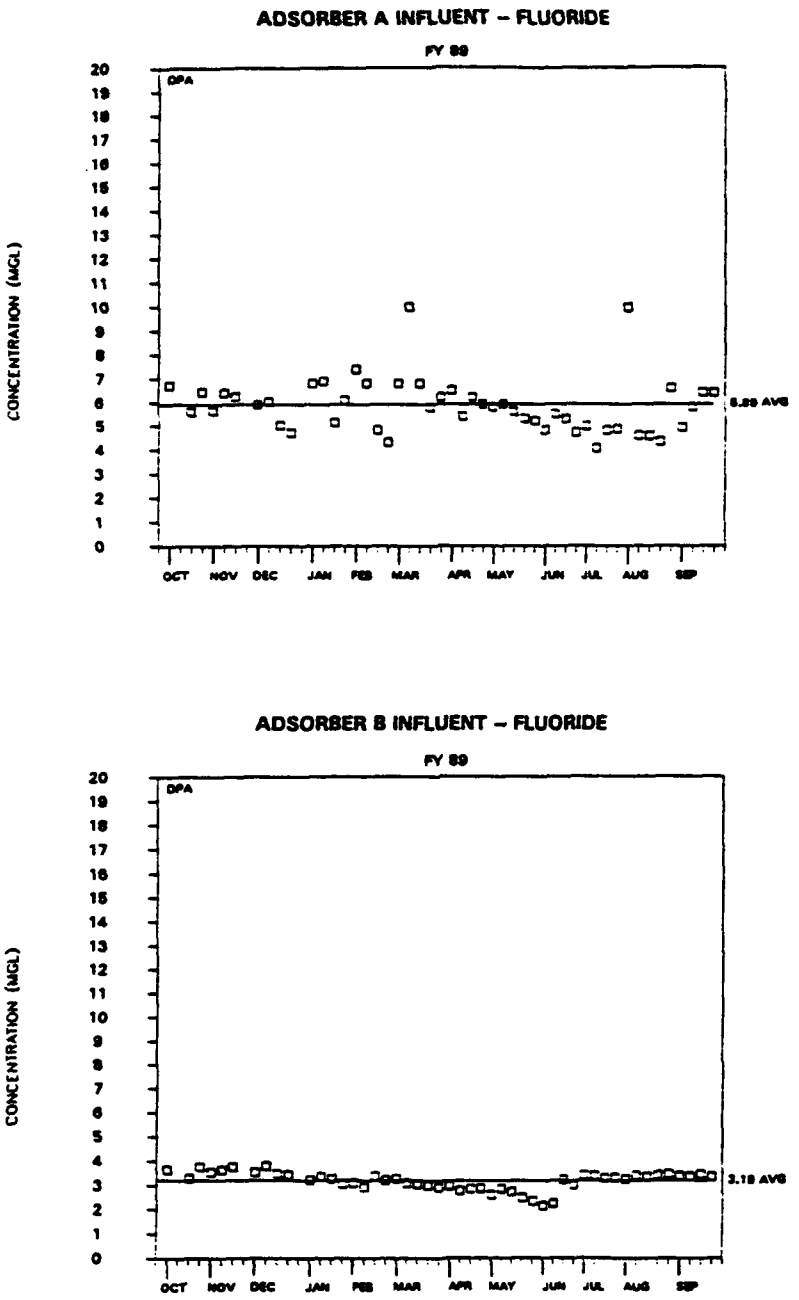


Figure 15. FY89 Fluoride concentration (Continued)

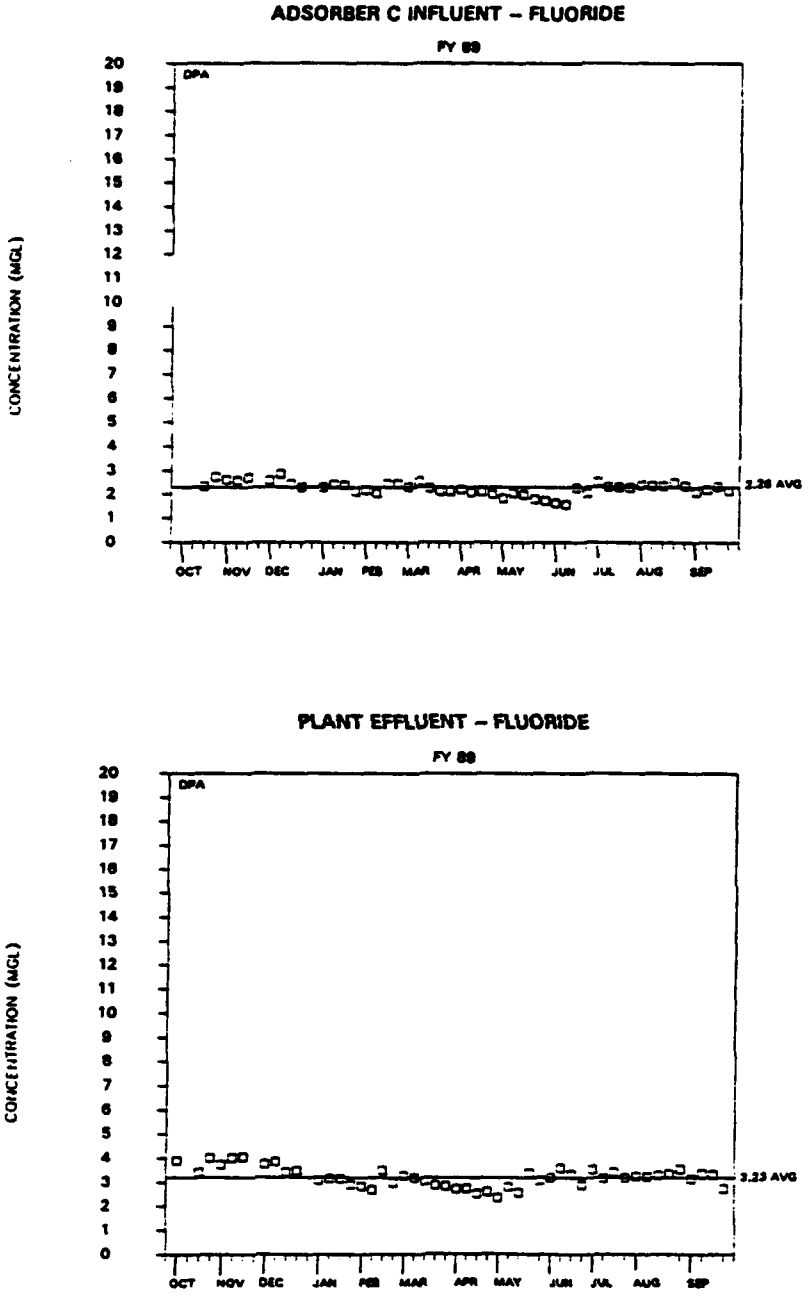


Figure 15. FY89 Fluoride concentration (Concluded)

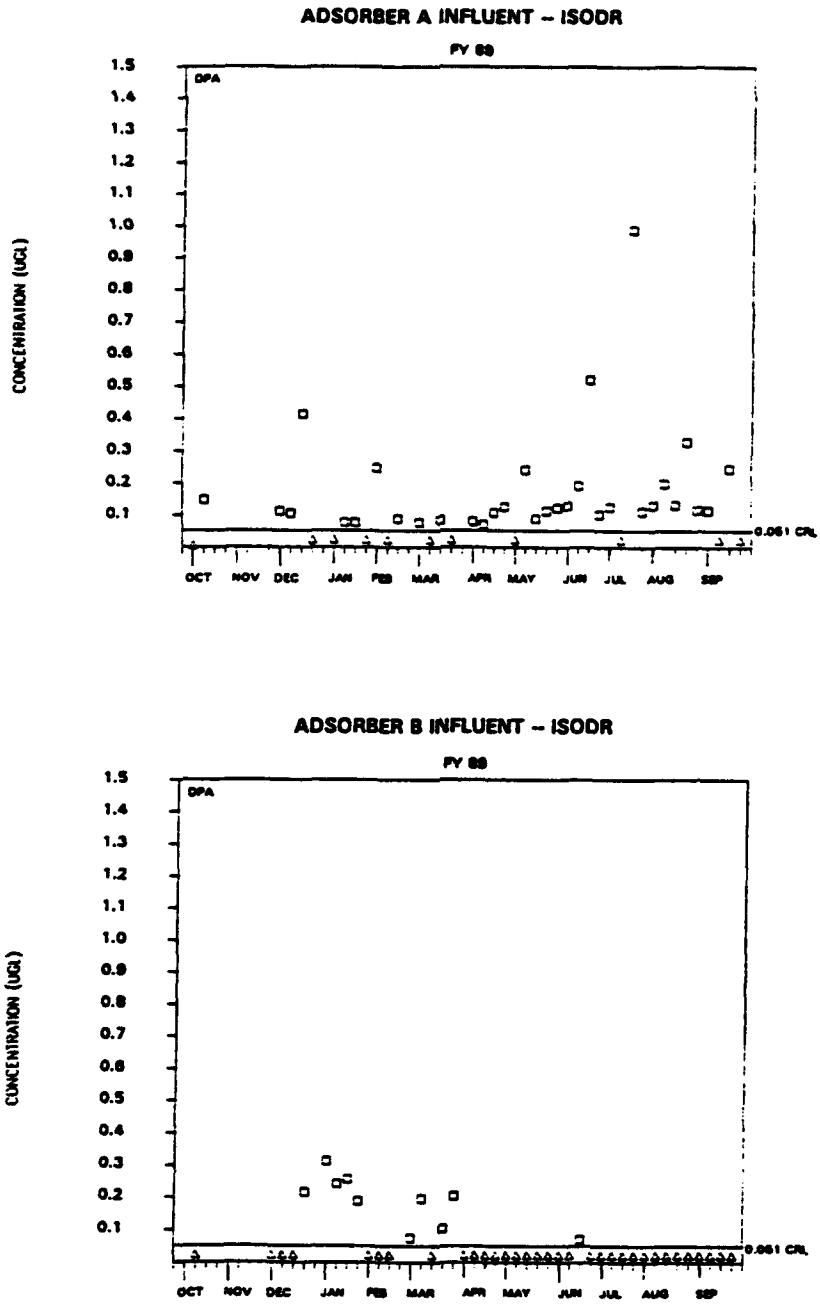


Figure 16. FY89 Isodrin concentrations (Continued)

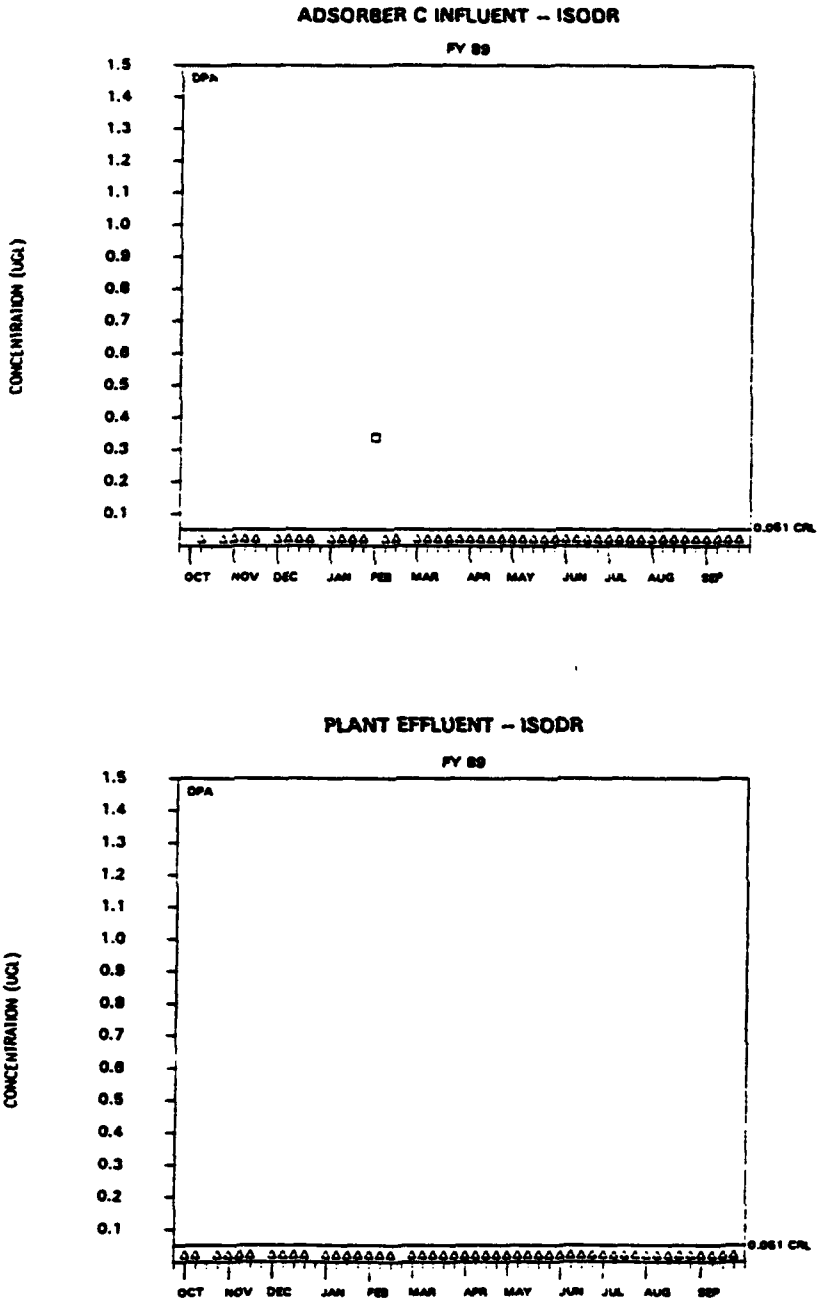


Figure 16. FY89 Isodrin concentrations (Concluded)

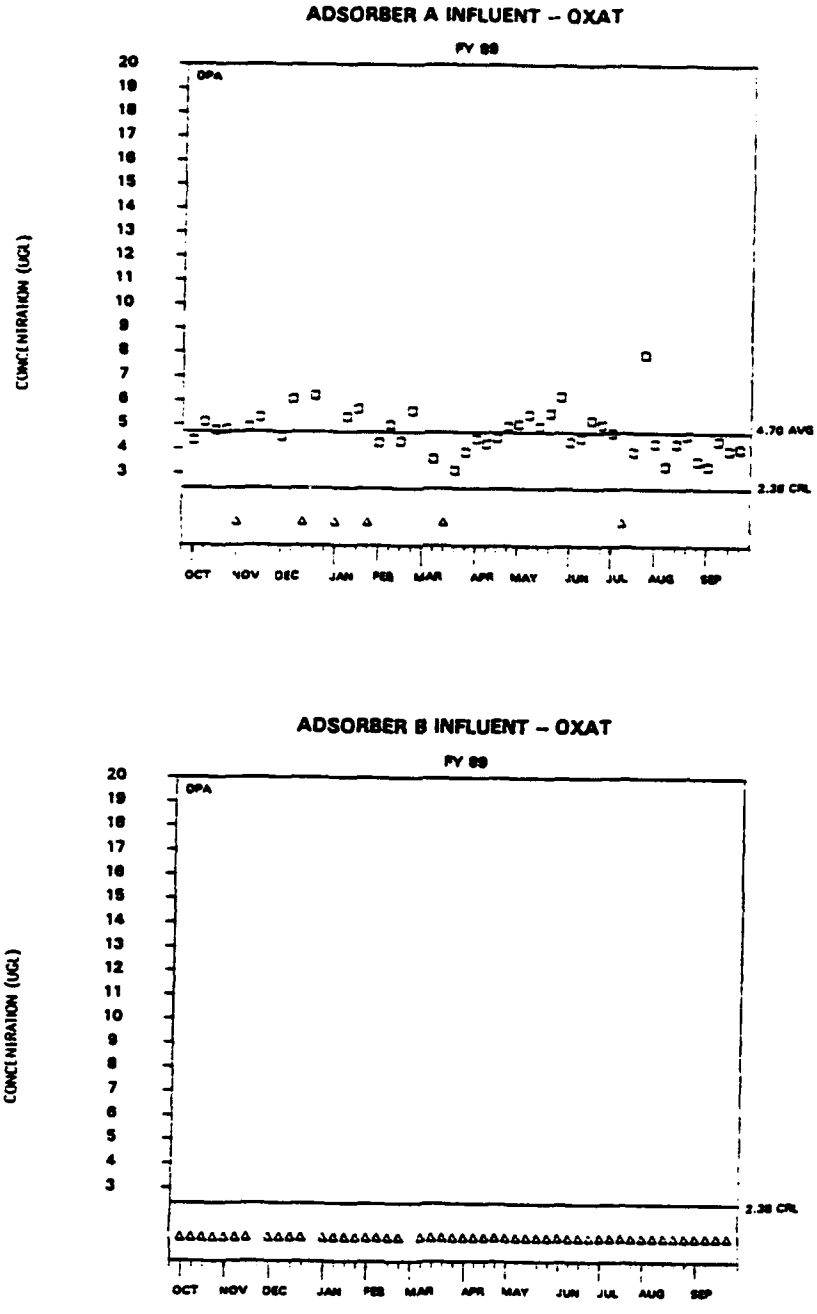


Figure 17. FY89 Oxathiane concentrations (Continued)

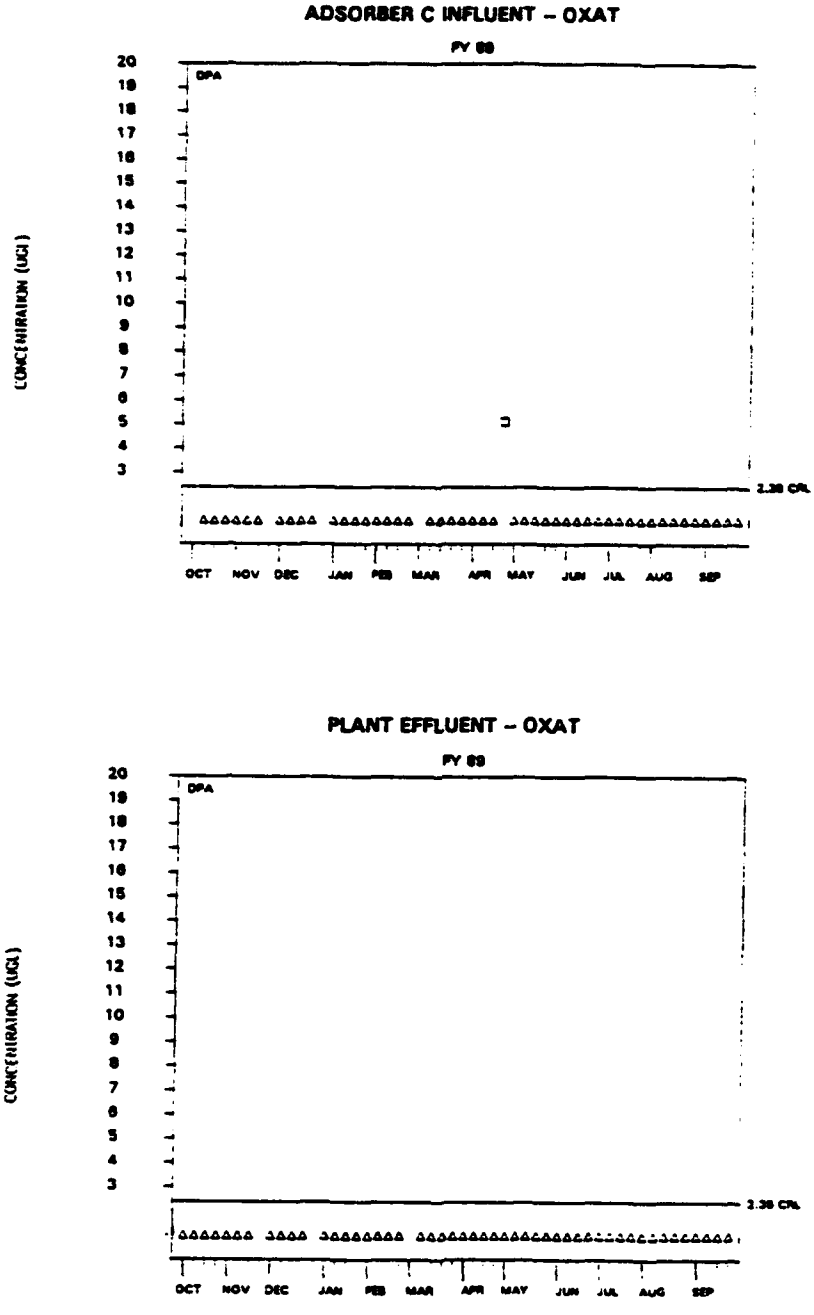


Figure 17. FY89 Oxathiane concentrations (Concluded)

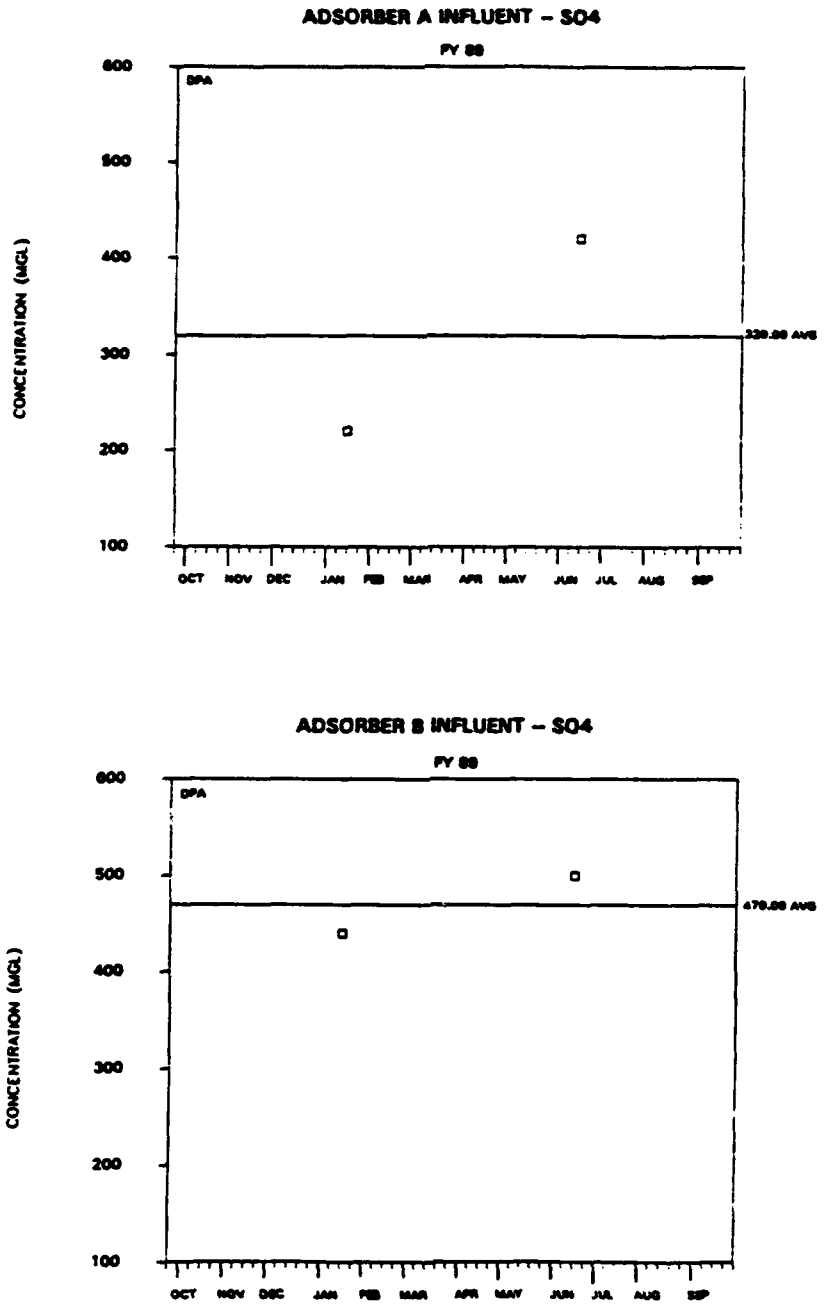


Figure 18. FY89 Sulfate concentrations (Continued)

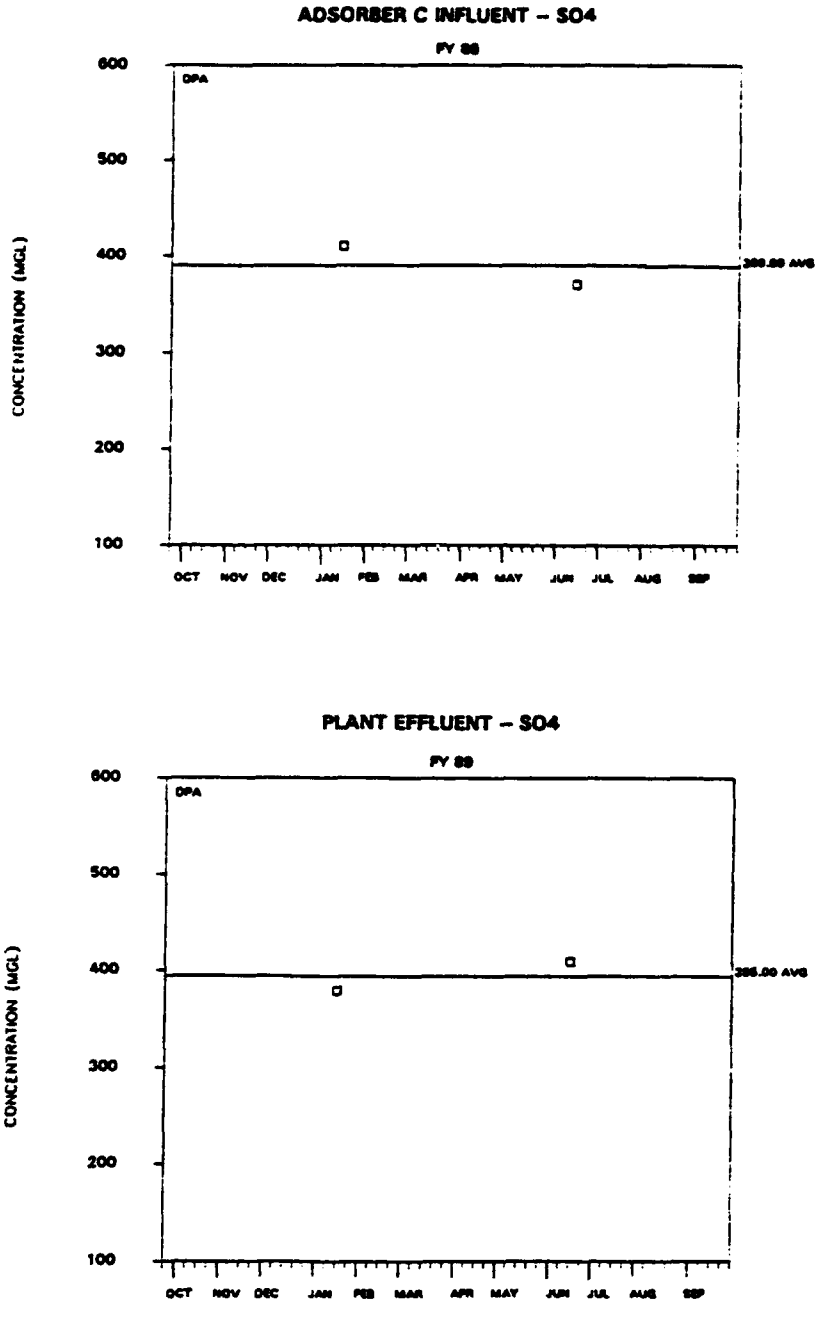


Figure 18. FY89 Sulfate concentrations (Concluded)

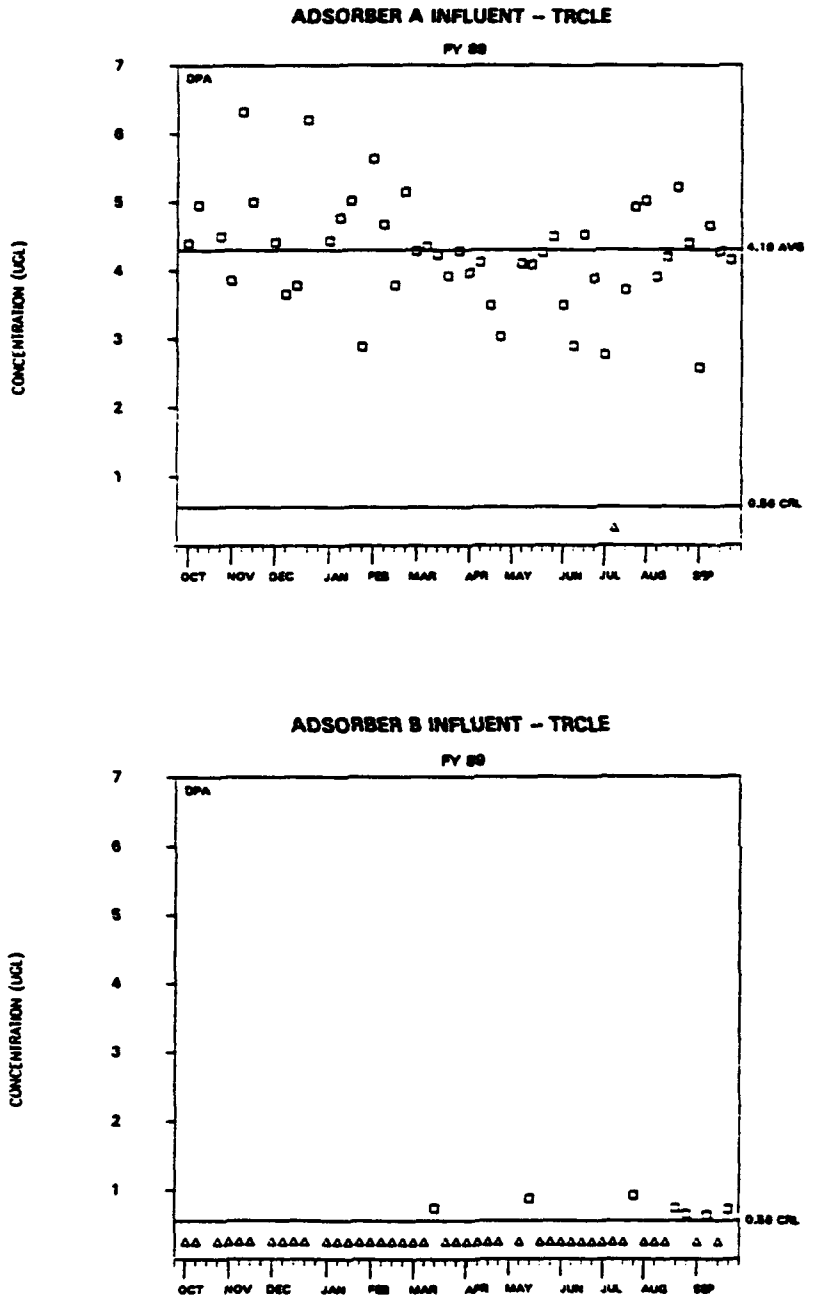


Figure 19. FY89 Trichloroethylene concentrations (Continued)

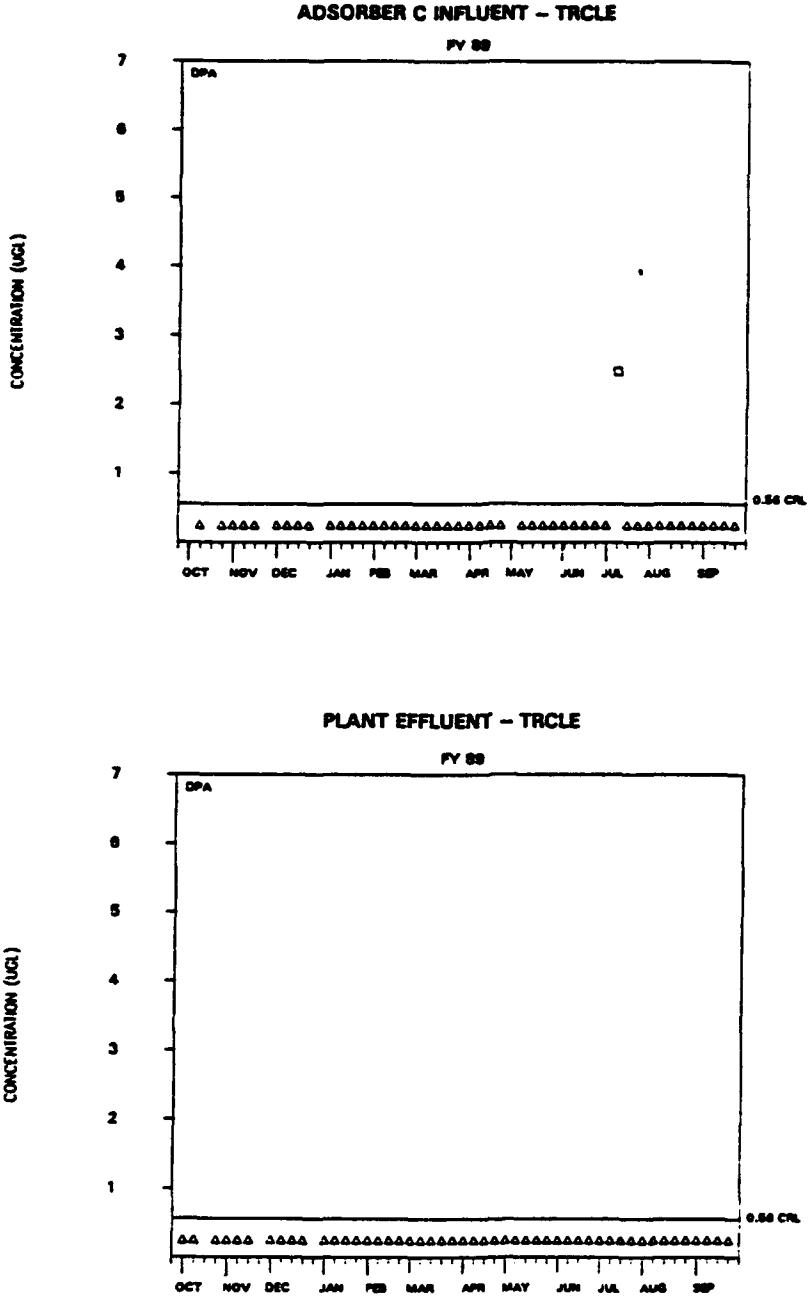


Figure 19. FY89 Trichloroethylene concentrations (Concluded)

6.3 ppb. The average for the year was 4.3 ppb based on 50 samples. A few samples of influent to adsorber B were found to contain trichloroethylene in excess of the CRL with a maximum concentration of approximately 1 ppb. Only one sample of influent to adsorber C and none of the treatment plant effluent samples contained trichloroethylene in excess of the CRL.

1,2 Dichloroethane

33. The CRL for 1,2 dichloroethane (Figure 20) in FY89 was 1.1 ppb. No MOL has been established. Only two samples were collected from the three influent and the plant effluent streams during the year. The average concentration in the influent to adsorber A was 4.7 ppb. None of the samples of the influents to adsorbers B and C nor the treatment plant effluent contained 1,2 dichloroethane in excess of the CRL.

1,3 Dimethylbenzene

34. The CRL for 1,3 dimethylbenzene (Figure 21) in FY89 was 1.32 ppb. No MOL has been established. Only two samples were collected from the three influent and the plant effluent streams during the year. None of the samples from the influents to adsorbers A and B nor the treatment plant effluent contained 1,3 dimethylbenzene in excess of the CRL. One sample of influent to adsorber C contained 1,3 dimethylbenzene above the CRL at approximately 1.8 ppb.

Bicycloheptadine

35. The CRL for bicycloheptadine (Figure 22) in FY89 was 5.9 ppb. No MOL has been established. Only one sample was collected from each of the three influent and the plant effluent streams during the year. The sample of influent collected from adsorber B contained bicycloheptadine above the CRL at approximately 13.5 ppb. None of the samples from the influents to adsorbers A and C nor the treatment plant effluent contained bicycloheptadine in excess of the CRL.

Benzene

36. The CRL for benzene (Figure 23) in FY89 was 1.05 ppb. No MOL has been established. Only two samples were collected from the three influent and the plant effluent streams during the year. None of the samples from the influents to the adsorbers contained benzene in excess of the CRL. One sample of plant effluent contained benzene at a concentration above the CRL at approximately 1.4 ppb.

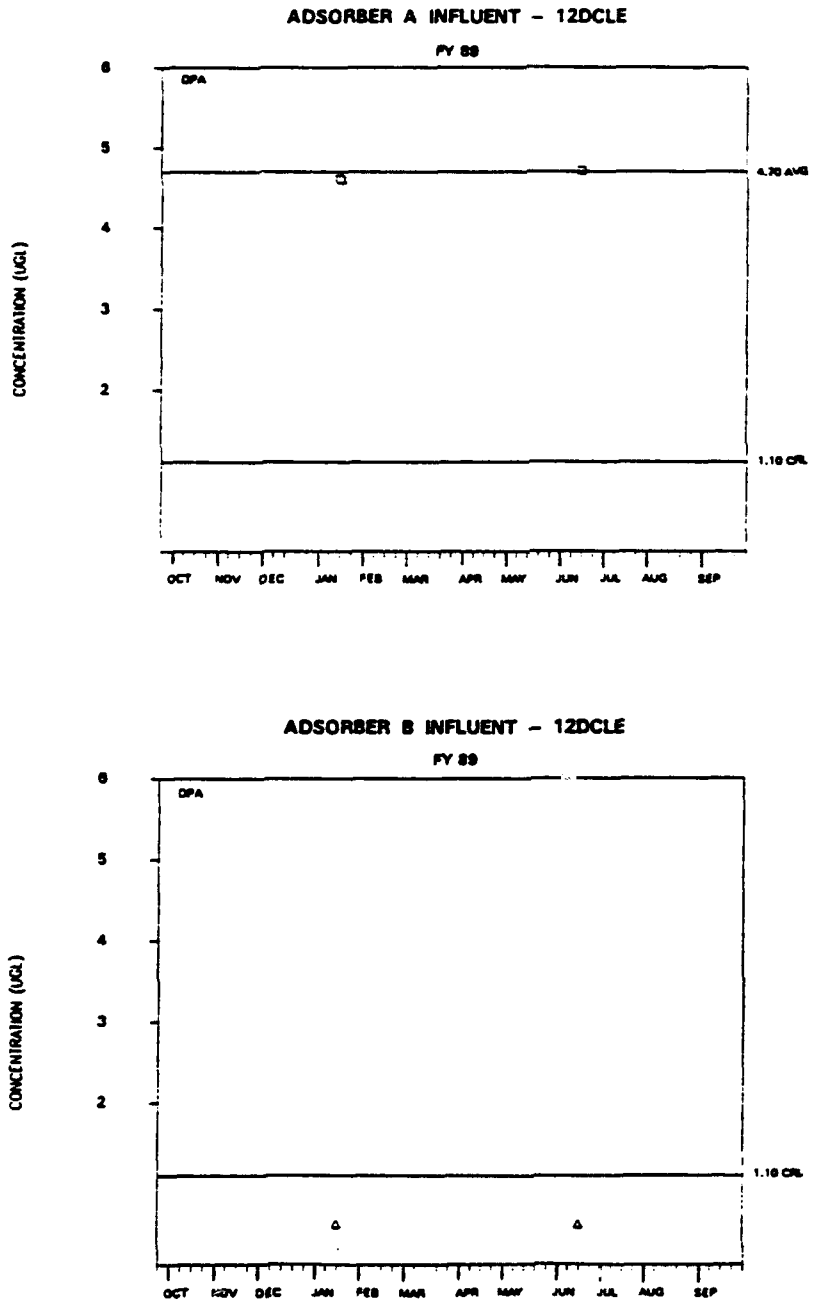
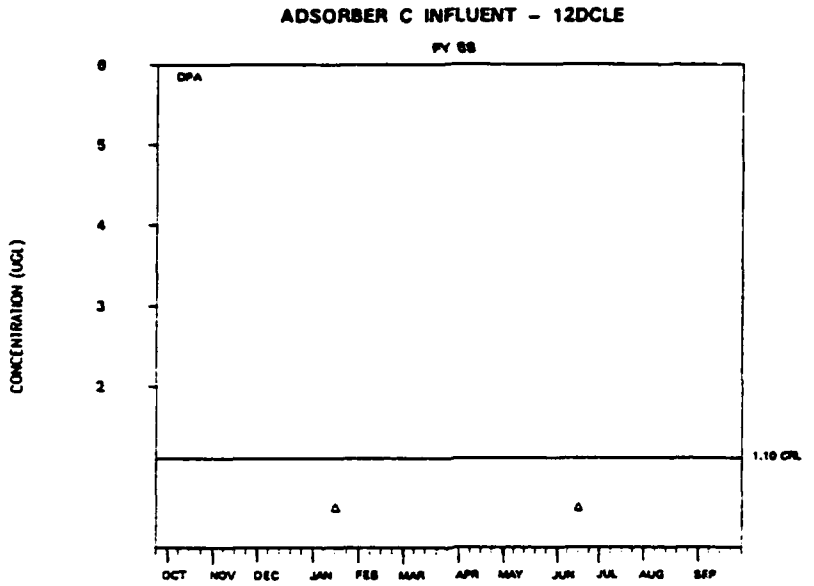


Figure 20. FY89 1,2 Dichloroethane concentrations (Continued)



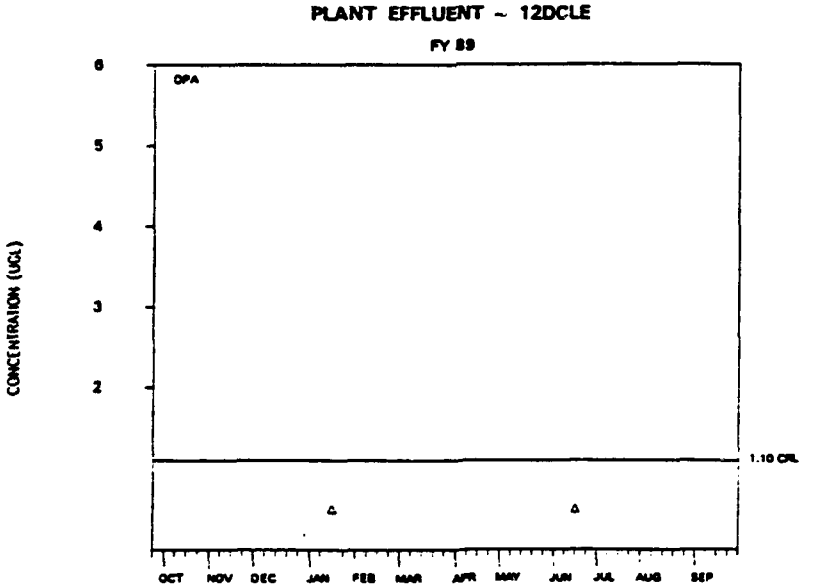


Figure 20. FY89 1,2 Dichloroethane concentrations (Concluded)

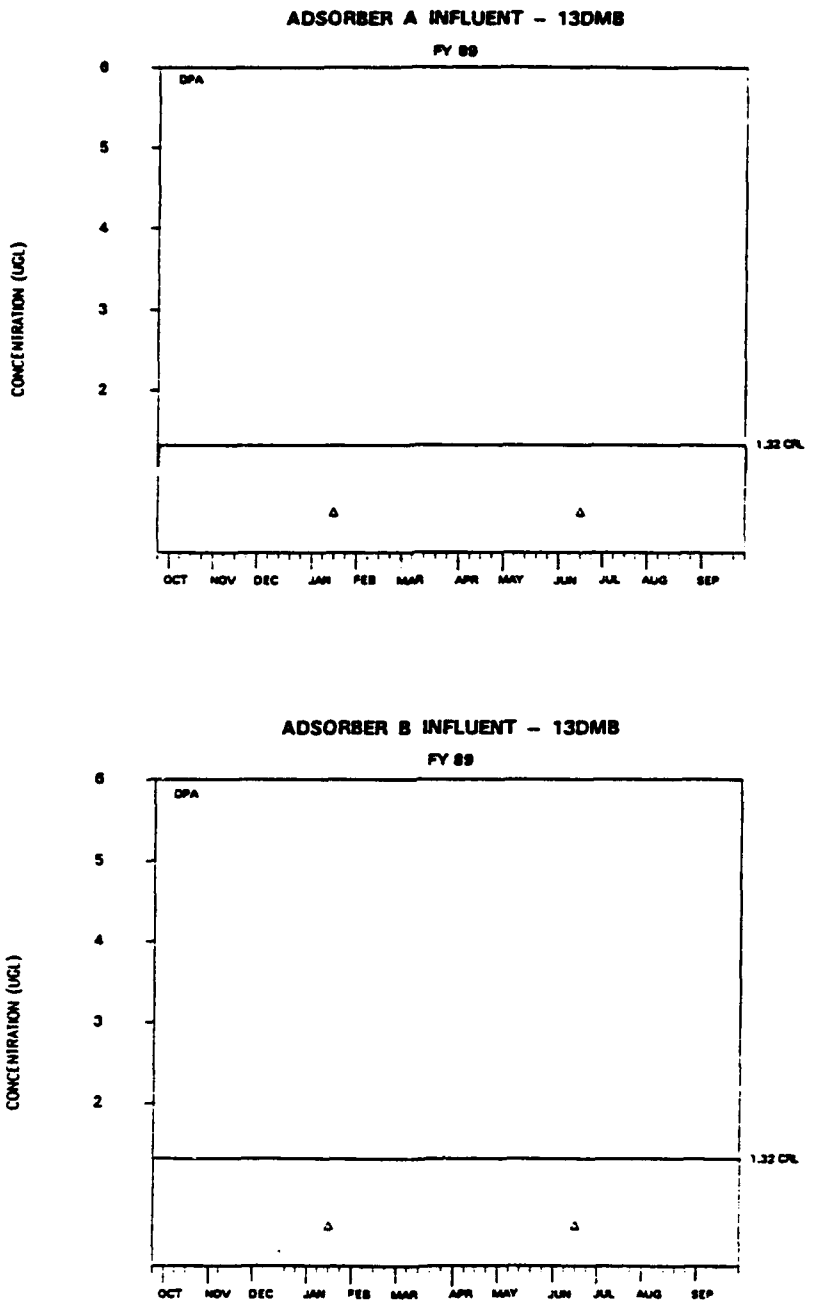


Figure 21. FY89 1,3 Dimethylbenzene concentrations (Continued)

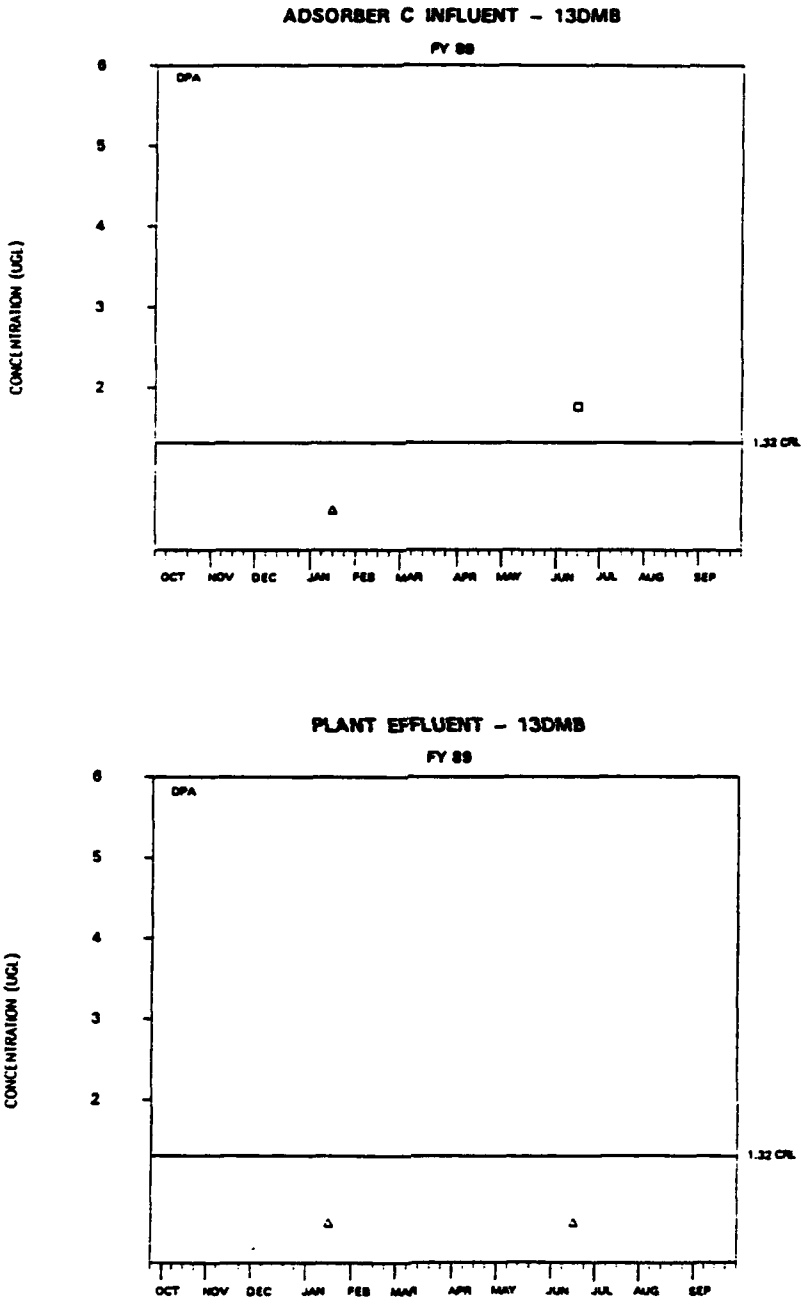


Figure 21. FY89 1,3 Dimethylbenzene concentrations (Concluded)

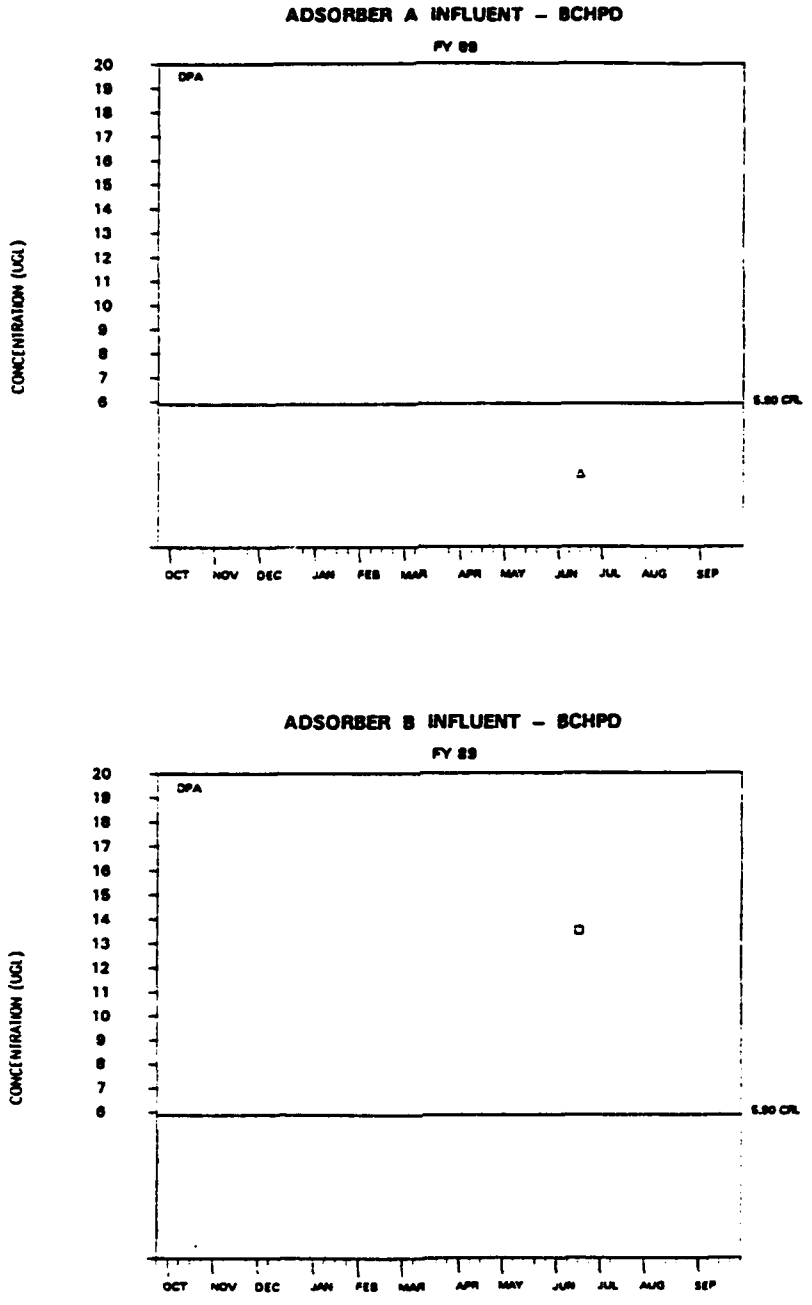


Figure 22. FY89 Bicycloheptadine concentrations (Continued)

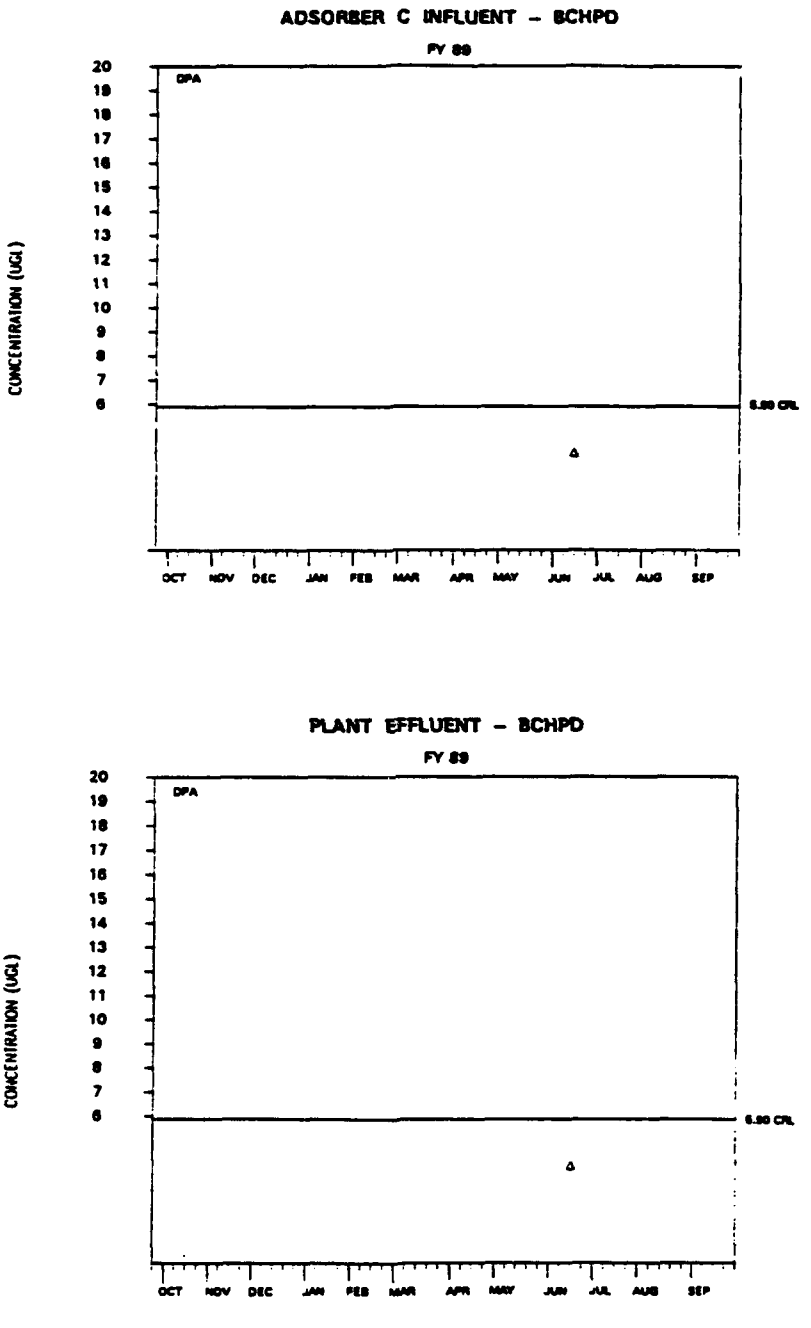


Figure 22. FY89 Bicycloheptadine concentrations (Concluded)

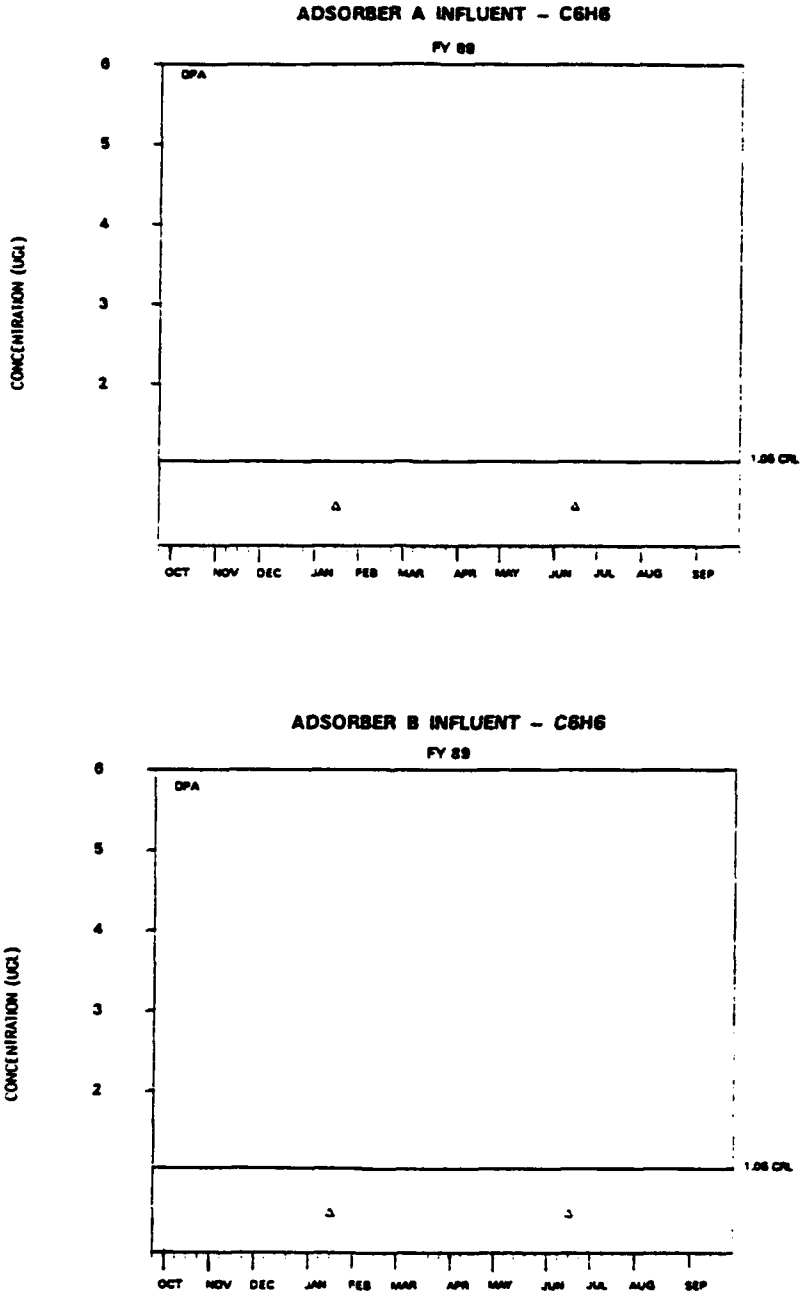


Figure 23. FY89 Benzene concentrations (Continued)

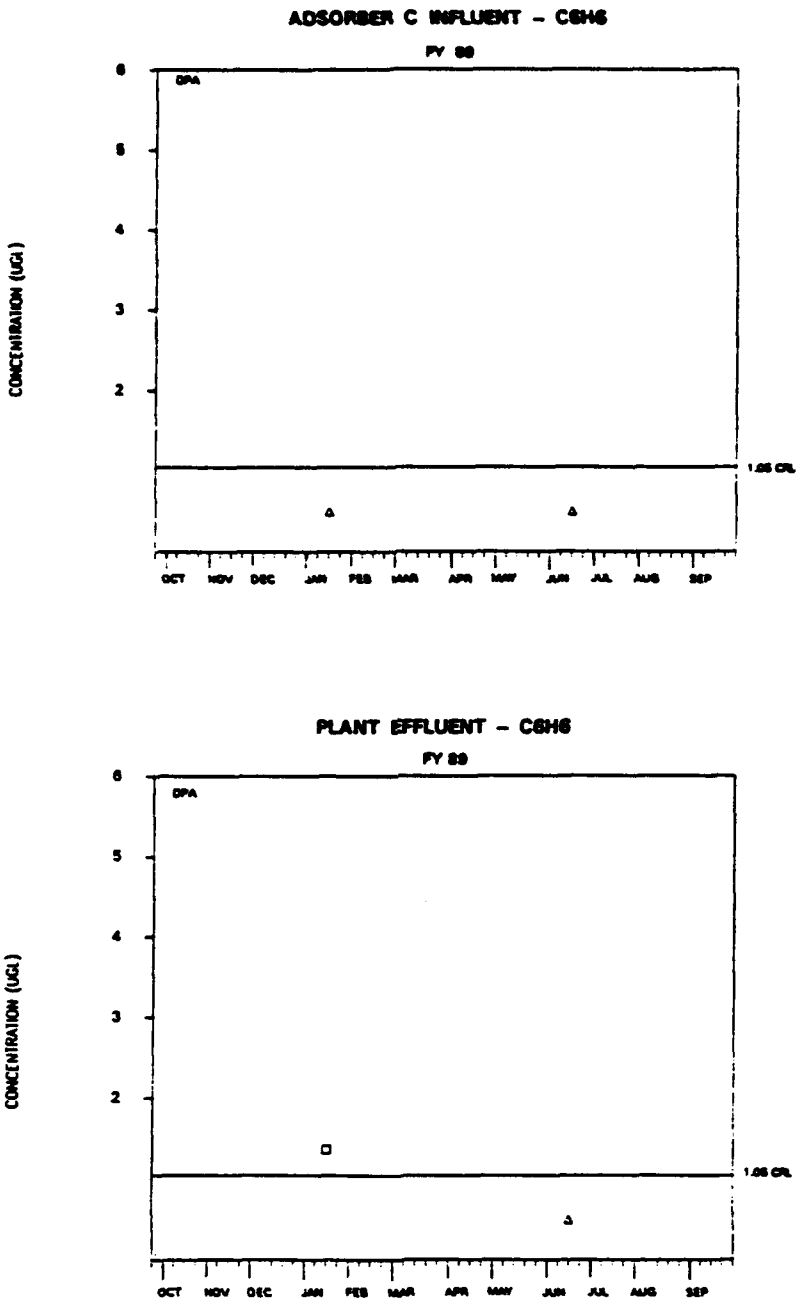


Figure 23. FY89 Benzene concentrations (Concluded)

Chloroform

37. The CRL for chloroform (Figure 24) in FY89 was 0.5 ppb. No MOL has been established. Only two samples were collected from the three influent and the plant effluent streams during the year. The average chloroform concentrations in the influents to adsorbers A and B were 3.1 ppb and 10.3 ppb, respectively. One sample of influent to adsorber C and one sample of plant effluent contained chloroform in excess of the CRL at 0.55 ppb and 0.8 ppb, respectively.

Hexachloroclopentadiene

38. The CRL for hexachloroclopentadiene (Figure 25) in FY89 was 0.048 ppb. No MOL has been established. Only two samples were collected from the three influent and the plant effluent streams during the year. One sample of influent to adsorber A and one sample of influent to adsorber B contained hexachlorocyclopentadiene at concentrations in excess of the CRL at 1.3 ppb and 0.2 ppb, respectively. No hexachlorocyclopentadiene at concentrations in excess of the CRL was found in the samples of influent to adsorber C nor in the plant effluent.

Toluene

39. The CRL for toluene (Figure 26) in FY89 was 1.45 ppb. No MOL has been established. Only two samples were collected from the three influent and the plant effluent streams during the year. One sample each from the influents to adsorbers A and B contained toluene in excess of the CRL at 170 ppb and 4.2 ppb, respectively. No concentrations above the CRL were found in the influent to adsorber C nor in the plant effluent.

Malathion

40. The CRL for malathion (figure 27) in FY89 was 0.37 ppb. No MOL has been established. Only one sample was collected from each of the three influent and the plant effluent streams during the year. The sample of the influent to adsorber A was found to contain a concentration of 2.74 ppb of malathion. None of the samples from the influents to adsorbers B and C nor the treatment plant effluent contained malathion in excess of the CRL.

p,p'-DDT

41. The CRL for p,p'-DDT (Figure 28) in FY 89 was 0.049 ppb. No MOL has been established. Only two samples were collected from the three influent and the plant effluent streams during the year. One sample each from the influents to adsorbers A and B contained p,p-DDT in excess of the CRL at

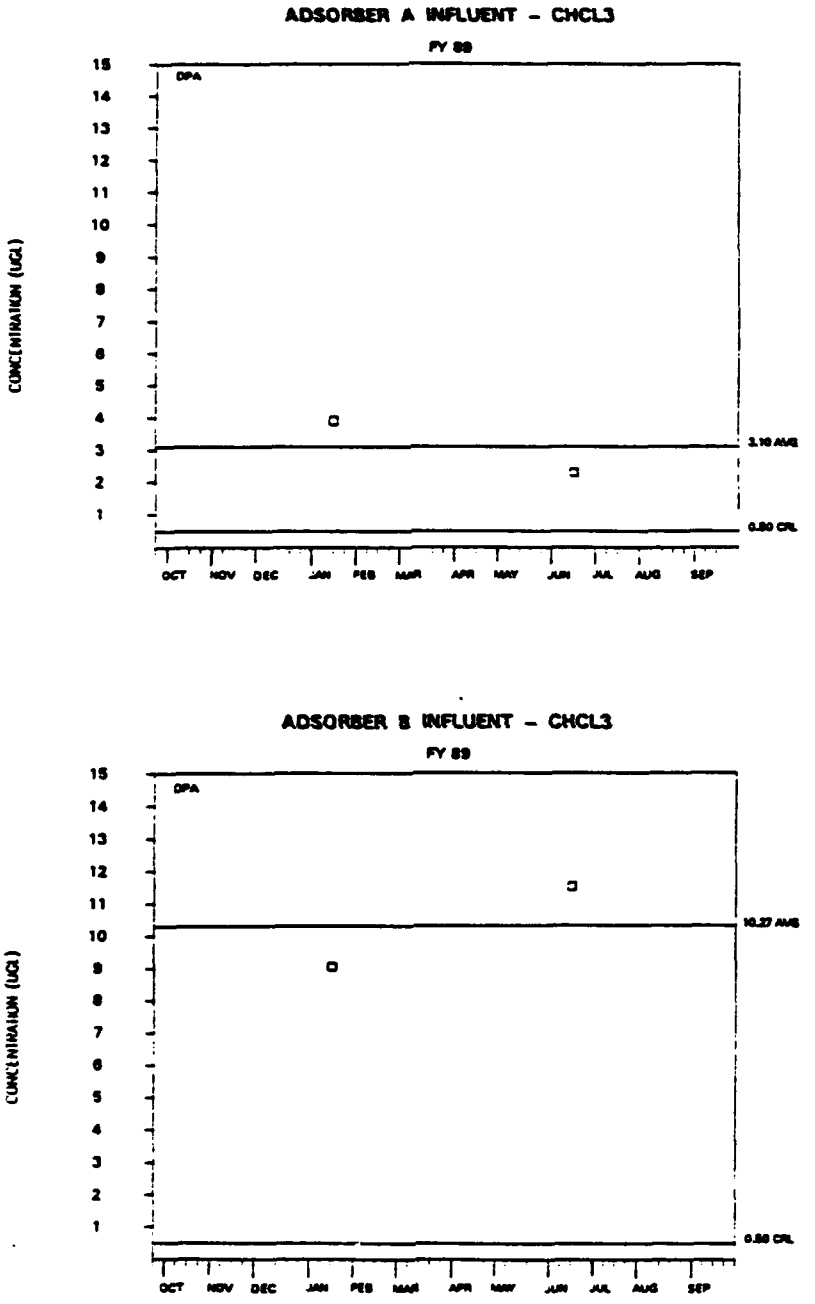


Figure 24. FY89 Chloroform concentrations (Continued)

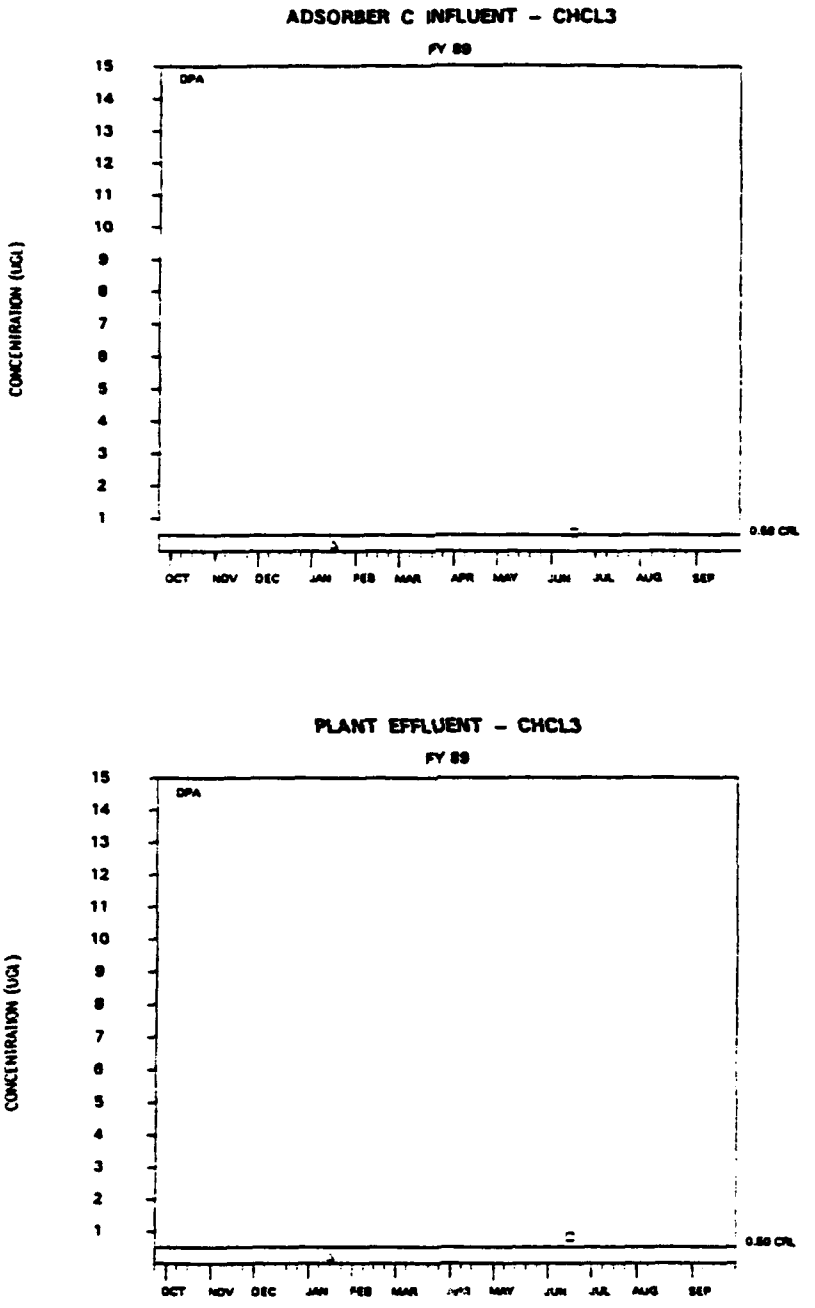


Figure 24. FY89 Chloroform concentrations (Concluded)

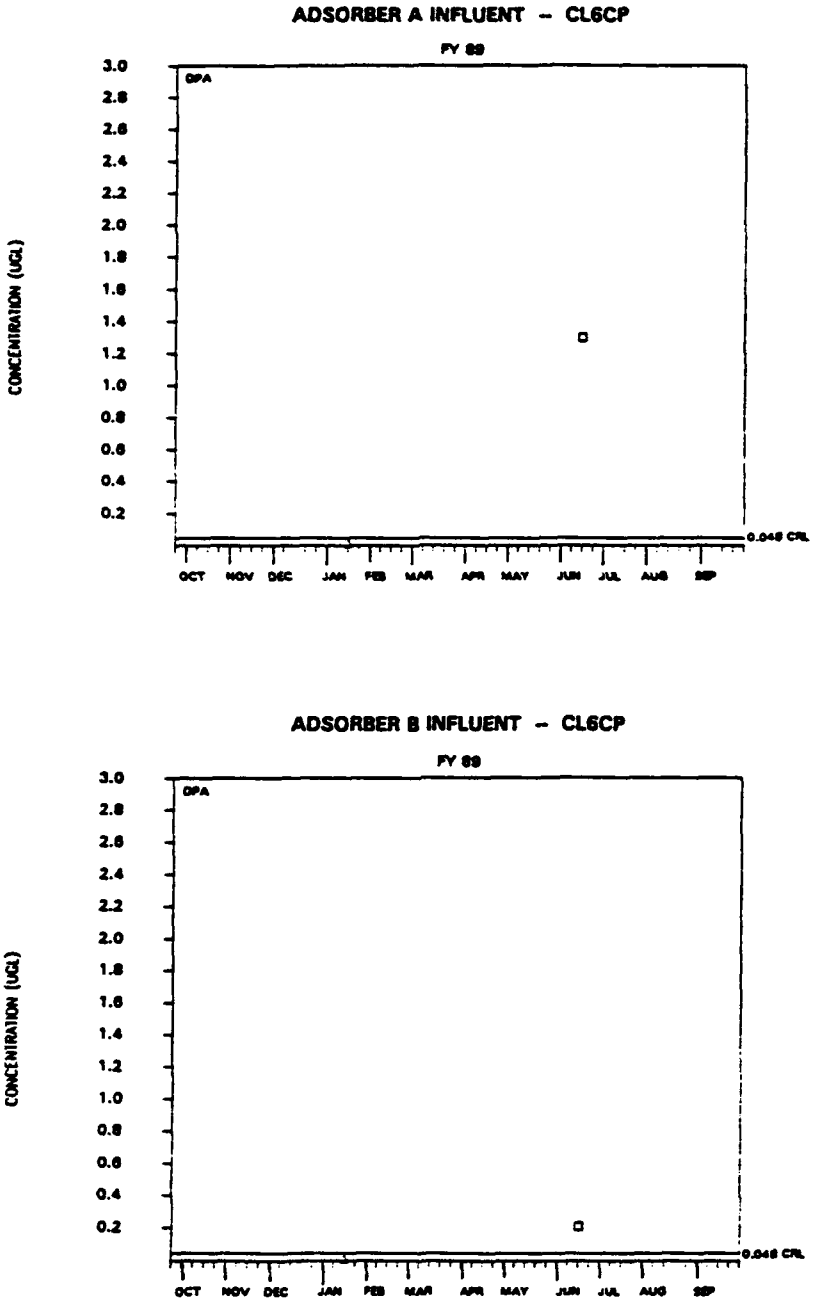


Figure 25. FY89 Hexachloropentadiene concentrations (Continued)

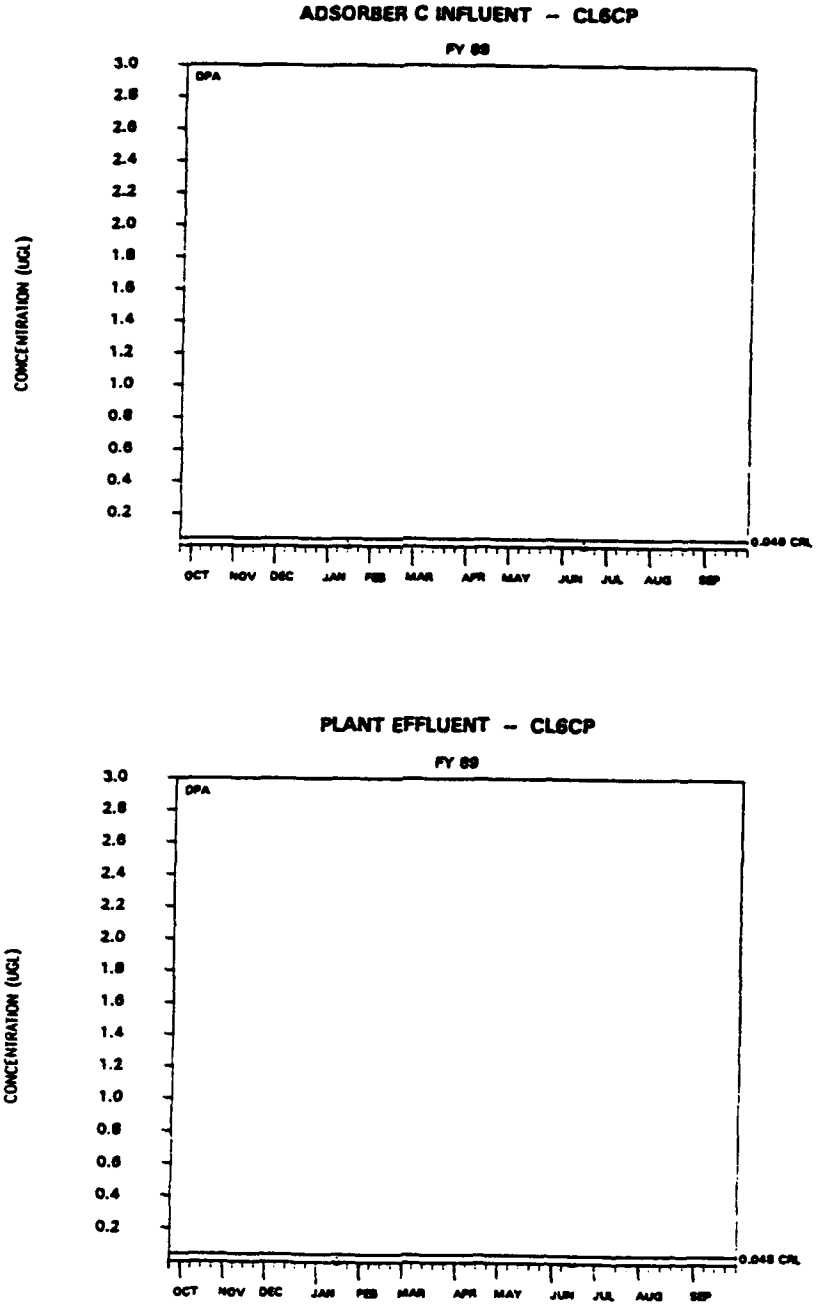


Figure 25. FY89 Hexachloropentadiene concentrations (Concluded)

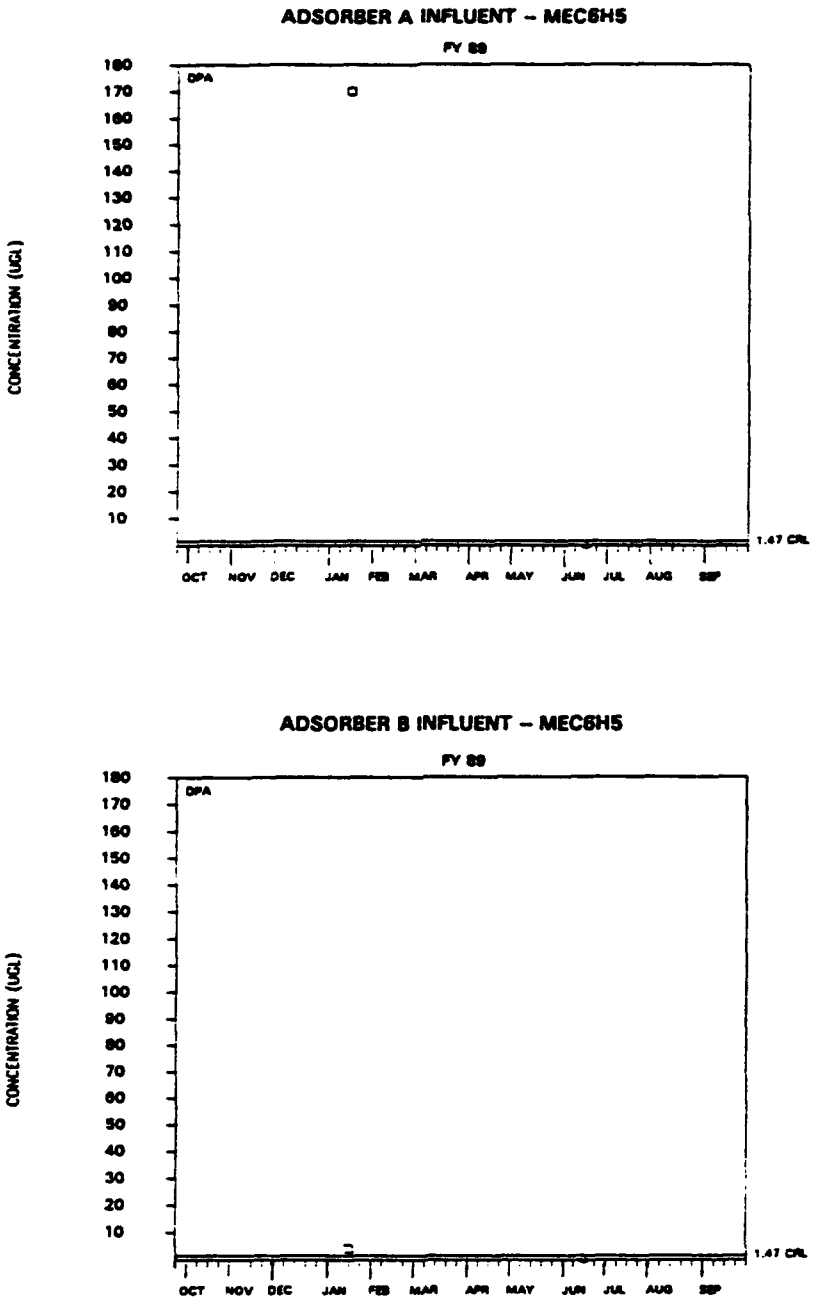


Figure 26. FY89 Toluene concentrations (Continued)

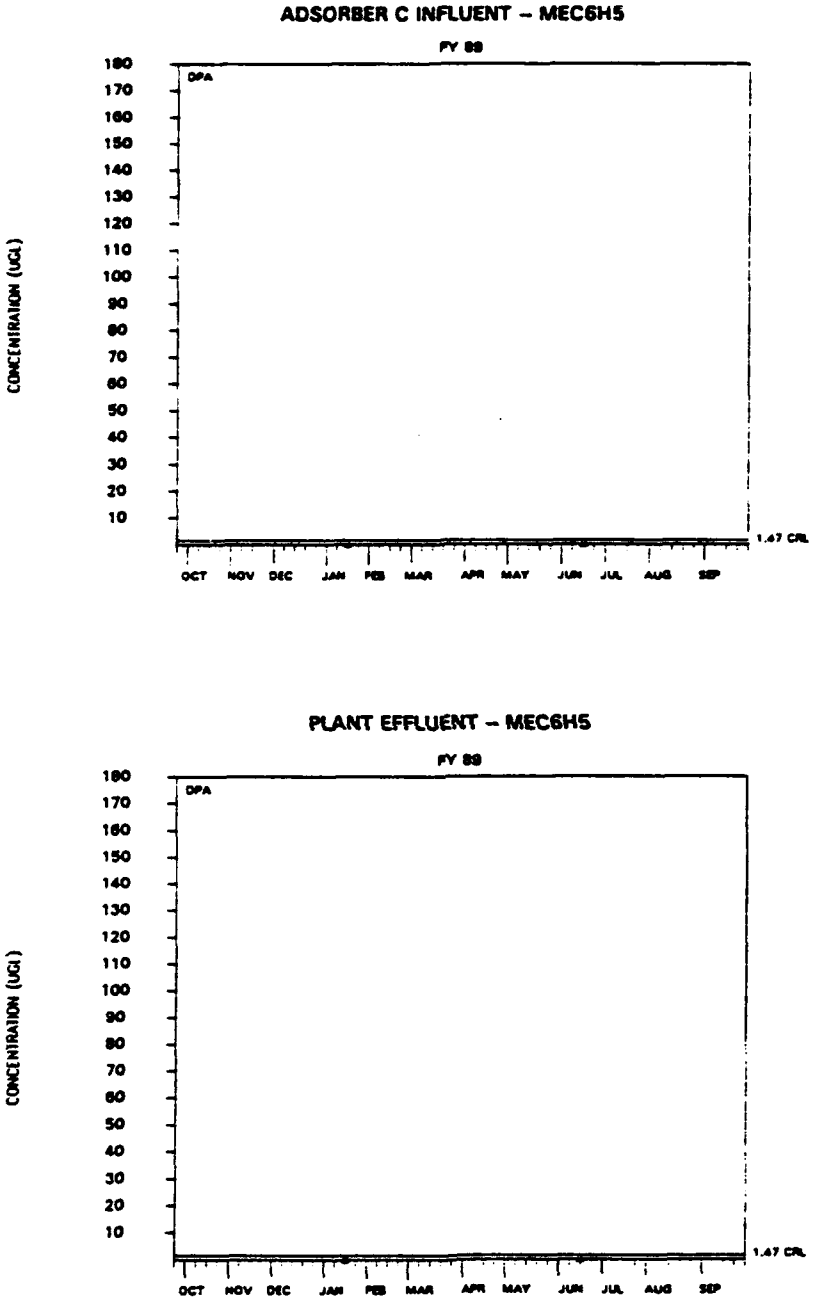


Figure 26. FY89 Toluene concentrations (Concluded)

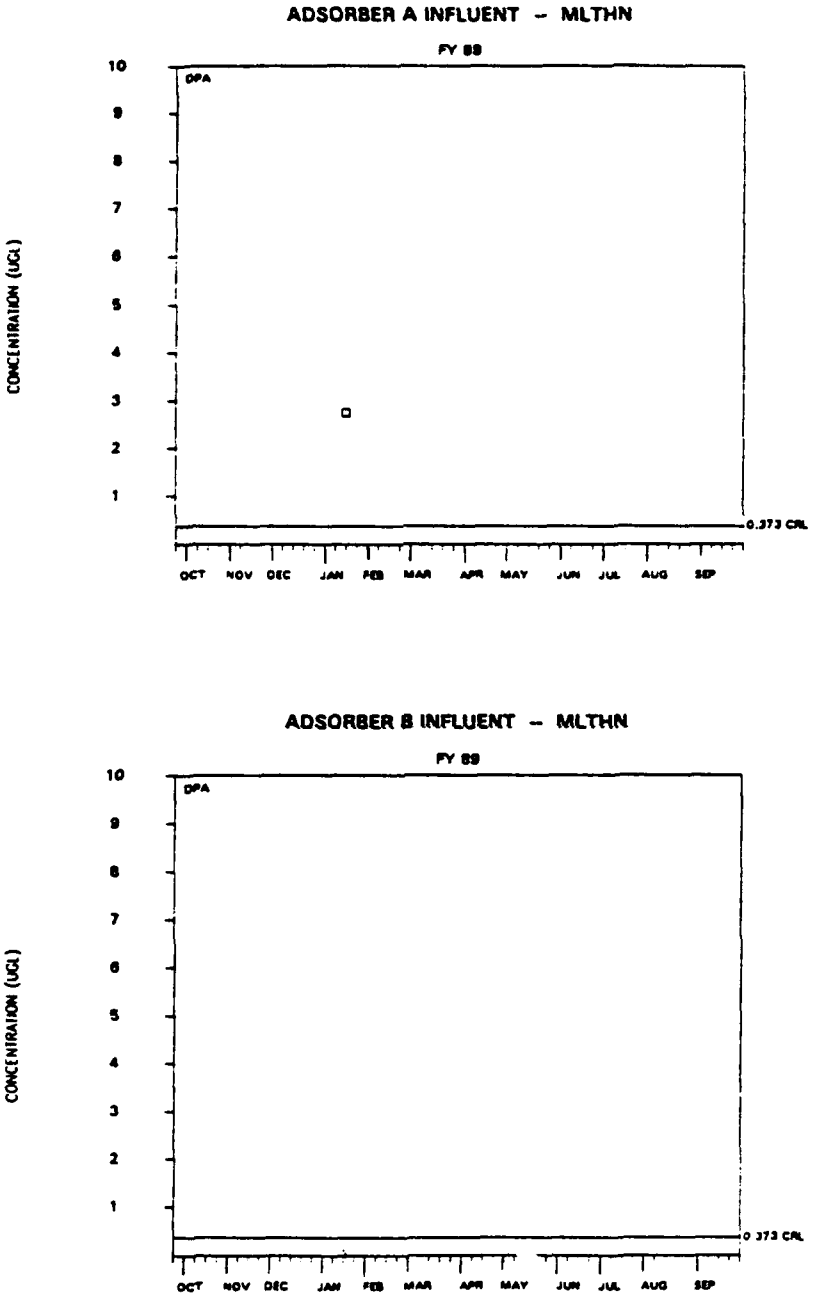


Figure 27. FY89 Malathion concentrations (Continued)

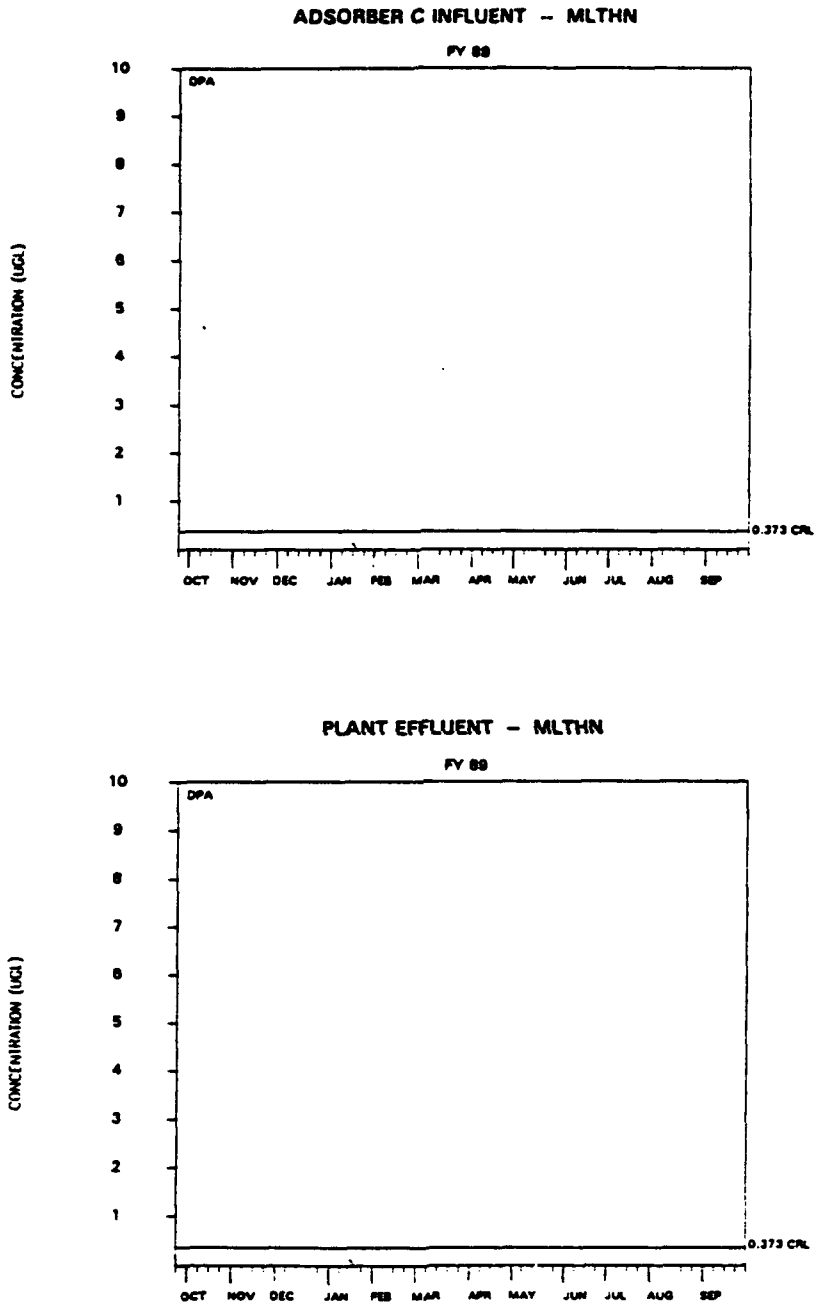


Figure 27. FY89 Malathion concentrations (Concluded)

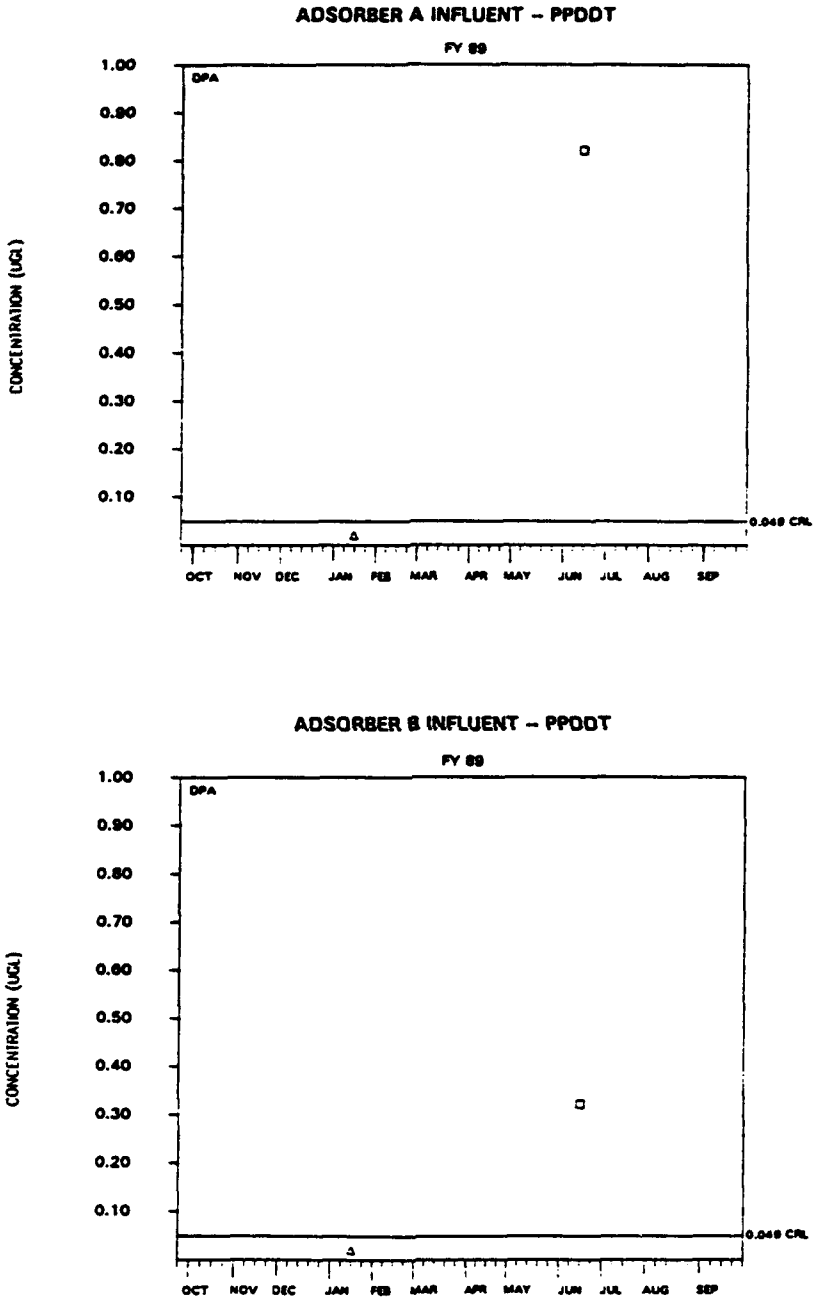


Figure 28. FY89 p,p-DDT concentrations (Continued)

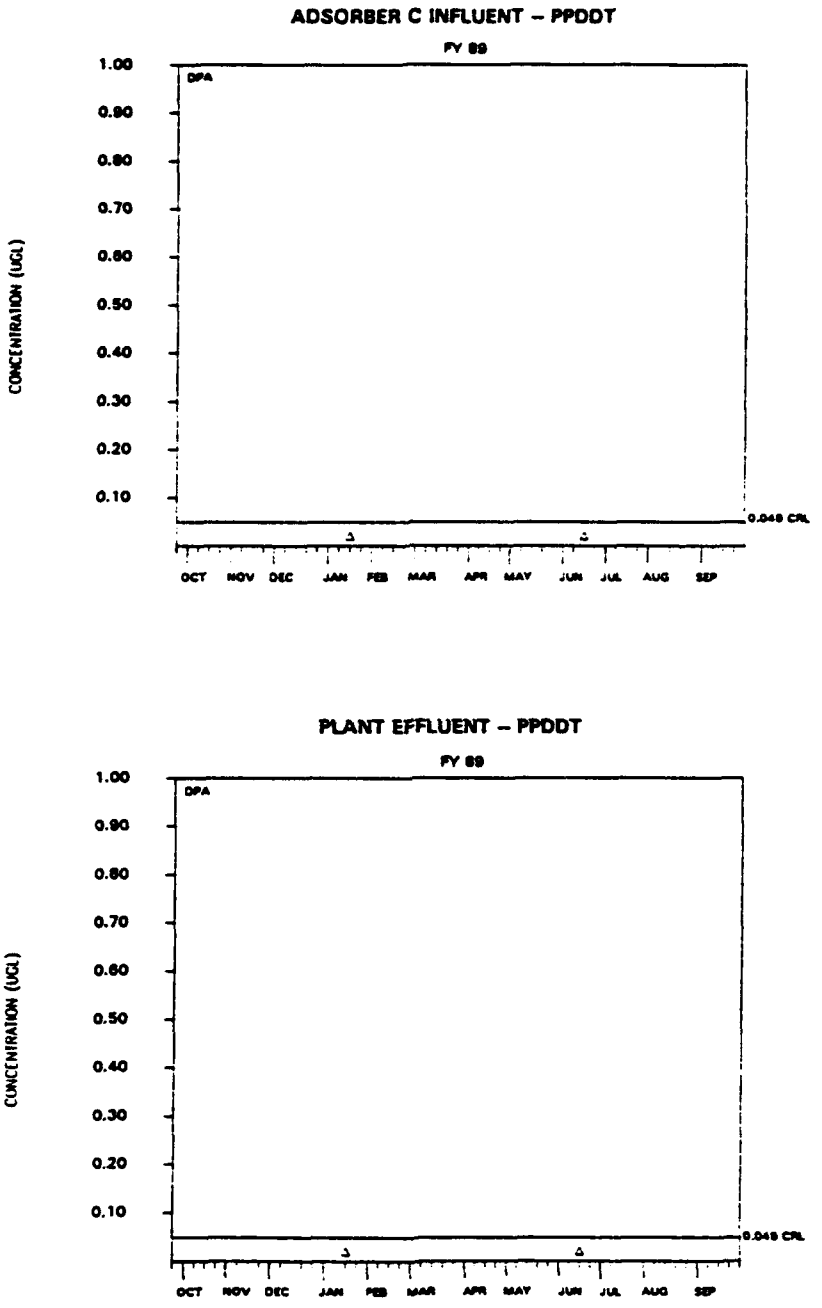


Figure 28. FY89 p,p-DDT concentrations (Concluded)

0.82 ppb and 0.32 ppb, respectively. No concentrations above the CRL were found in the influent to adsorber C nor in the plant effluent.

Parathion

42. The CRL for parathion (Figure 29) in FY89 was 0.647 ppb. No MOL has been established. Only two samples were collected from the three influent and the plant effluent during the year. One sample each from the influents to adsorbers A, B, and C contained parathion in excess of the CRL at 10.5 ppb, 2 ppb, and 1.8 ppb, respectively. No concentrations of parathion above the CRL were found in the treatment plant effluent.

Supona

43. The CRL for supona (Figure 30) in FY89 was 0.769 ppb. No MOL has been established. Only one sample was collected from each of the three influent and the plant effluent streams during the year. The samples of the influents to adsorbers A and B were found to contain concentrations of supona of 18 ppb and 2.5 ppb, respectively. None of the samples from the influent to adsorber C nor the treatment plant effluent contained supona in excess of the CRL.

Tetrachloroethylene

44. The CRL for tetrachloroethylene (Figure 31) in FY89 was 0.75 ppb. No MOL has been established. Only one sample was collected from each of the three influent and the plant effluent streams during the year. The samples of the influents to adsorber A and B were found to contain concentrations of tetrachloroethylene of 36 ppb and 8 ppb, respectively. None of the samples from the influent to adsorber C nor the treatment plant effluent contained tetrachloroethylene in excess of the CRL.

Xylene

45. The CRL for xylene (Figure 32) in FY89 was 1.36 ppb. No MOL has been established. Only two samples were collected from the three influent and the plant effluent streams during the year. One sample from the influent to adsorber A contained xylene in excess of the CRL at 1.9 ppb. No concentrations of xylene above the CRL were found in the influents to adsorbers B and C nor in the treatment plant effluent.

GC/MS Analysis

46. GC/MS analyses were conducted on influent and effluent samples collected in June, 1989. The results of the analysis are presented in Appendix B. Sulfoxide, sulfone, DCPD, DIMP, and dithiane were found in the influent to adsorber A in excess of their respective detection levels. DCPD and

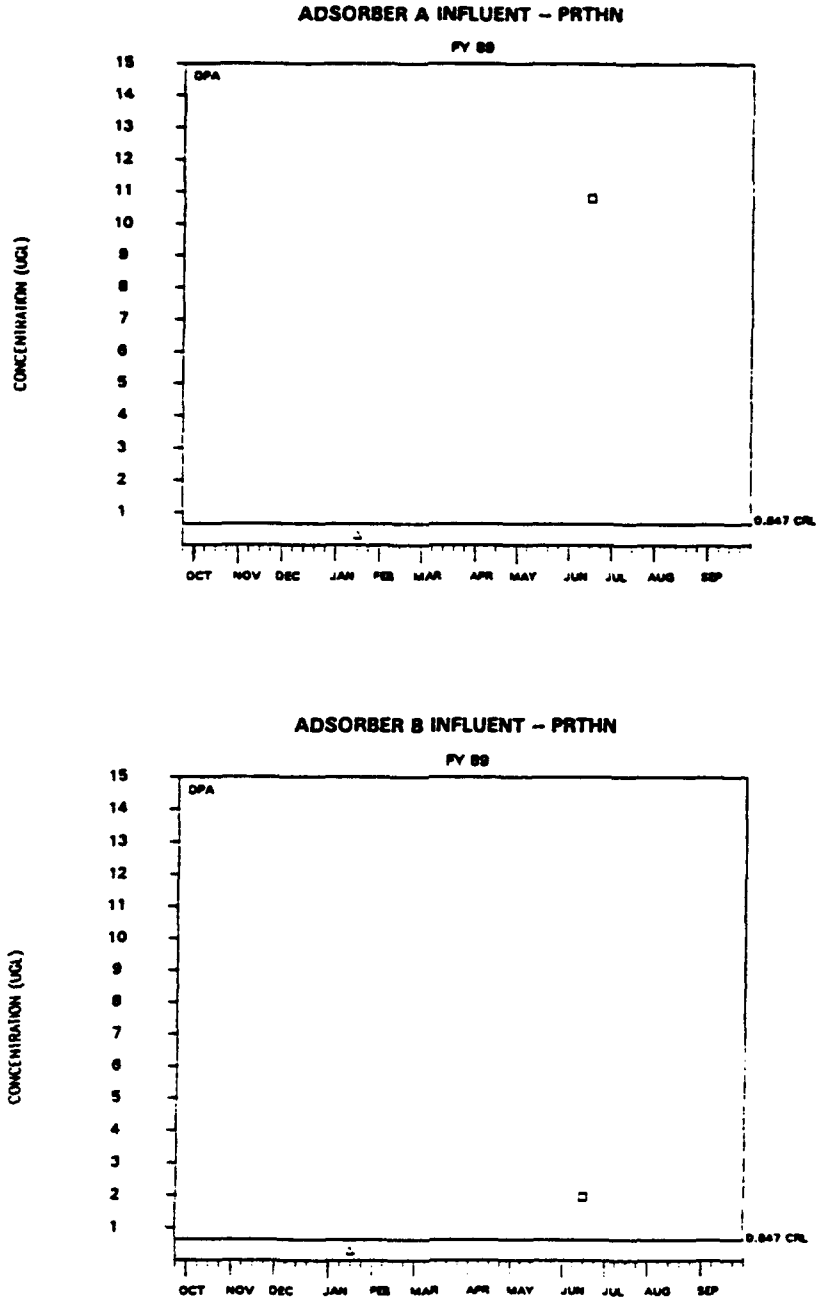


Figure 29. FY89 Parathion concentrations (Continued)

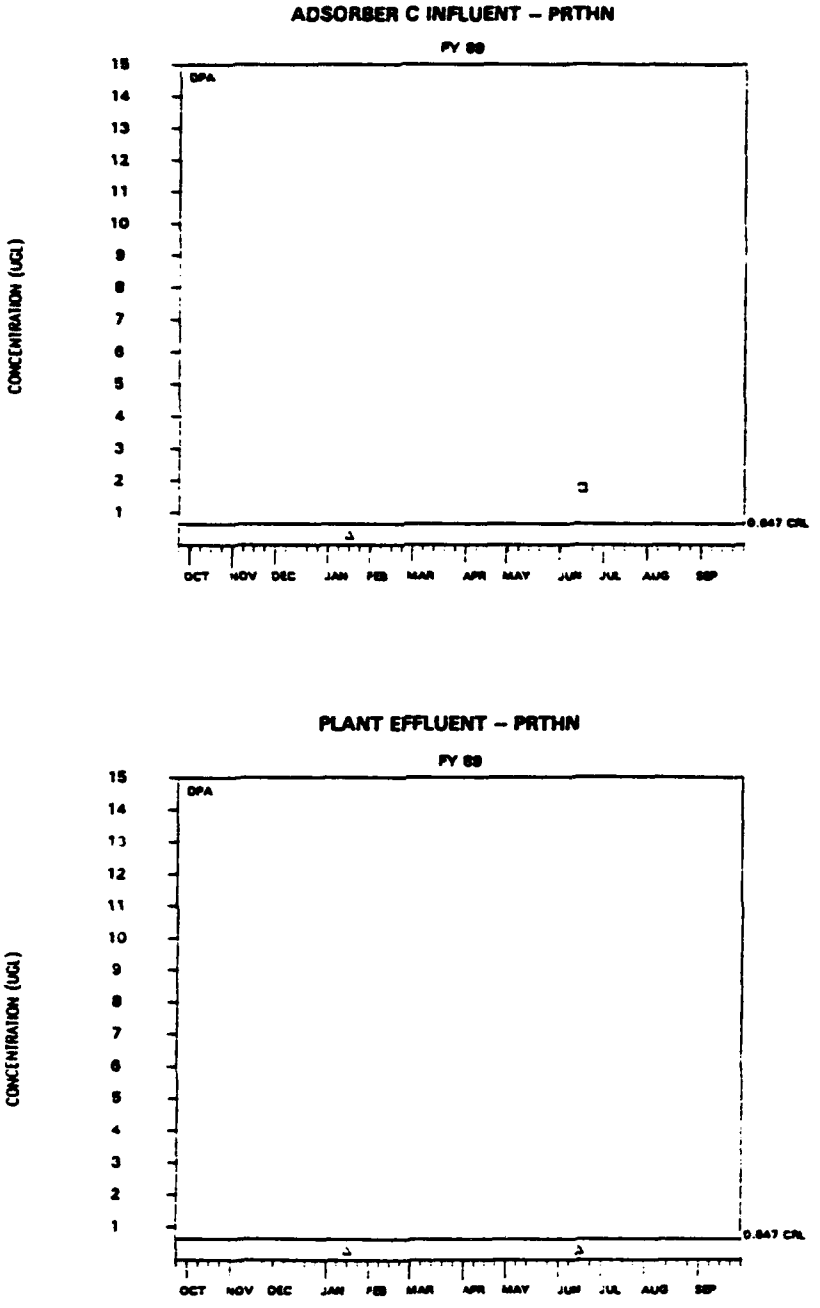


Figure 29. FY89 Parathion concentrations (Concluded)

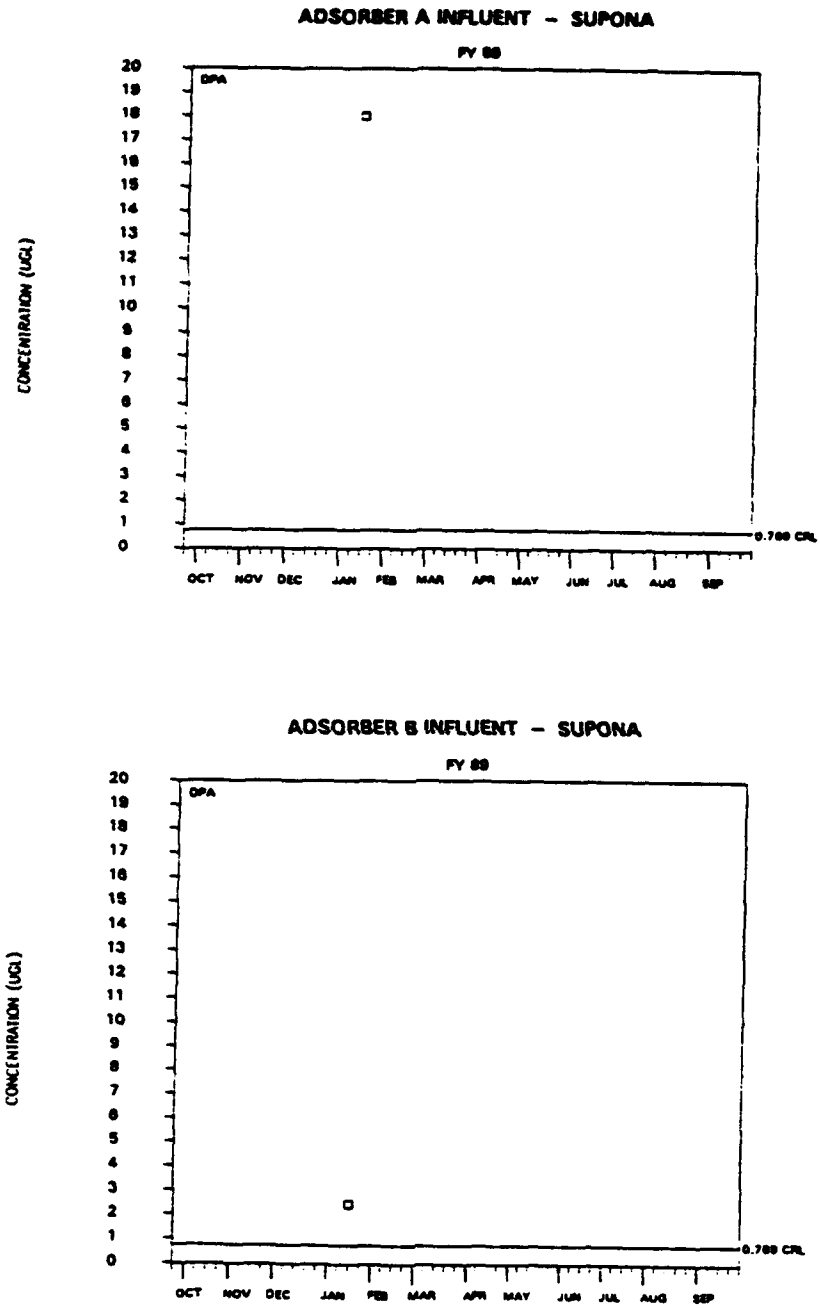


Figure 30. FY89 Supona concentrations (Continued)

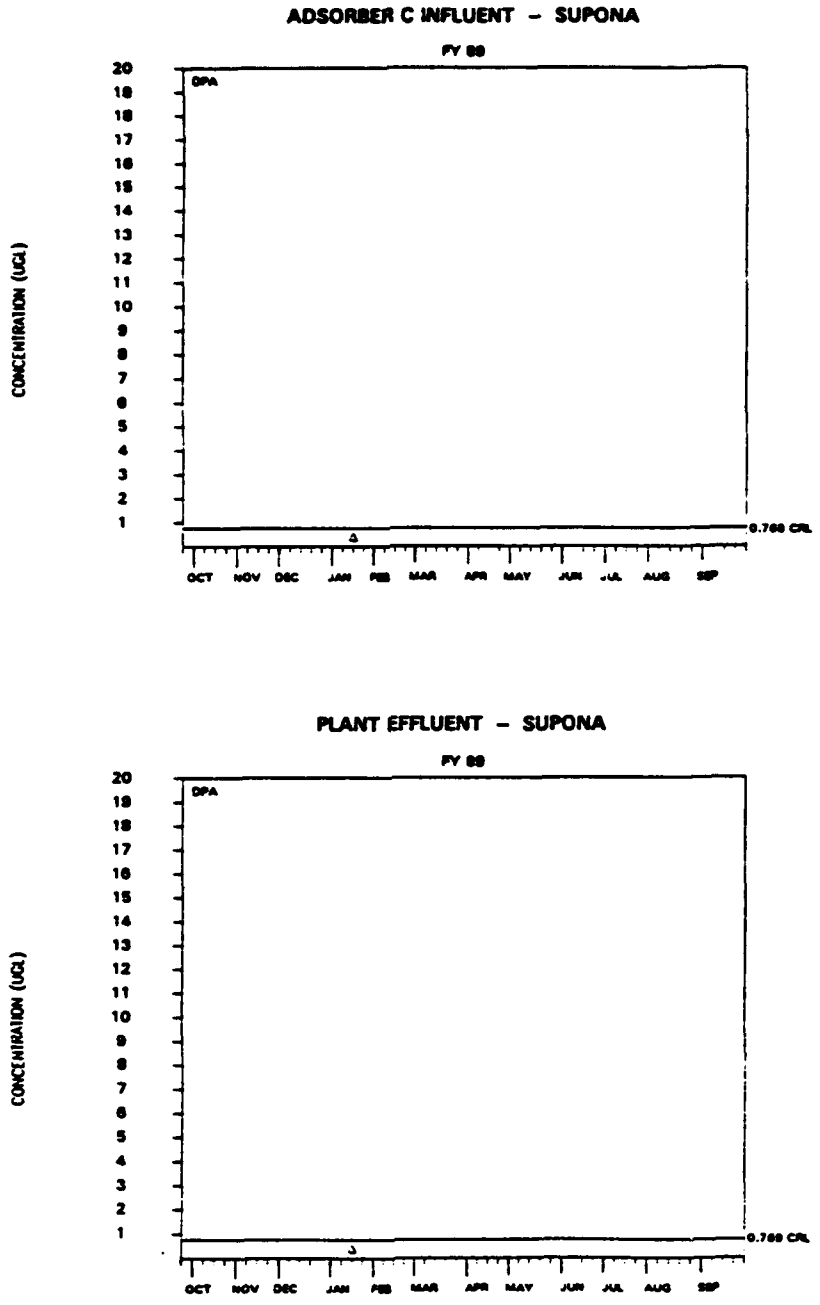


Figure 30. FY89 Supona concentrations (Concluded)

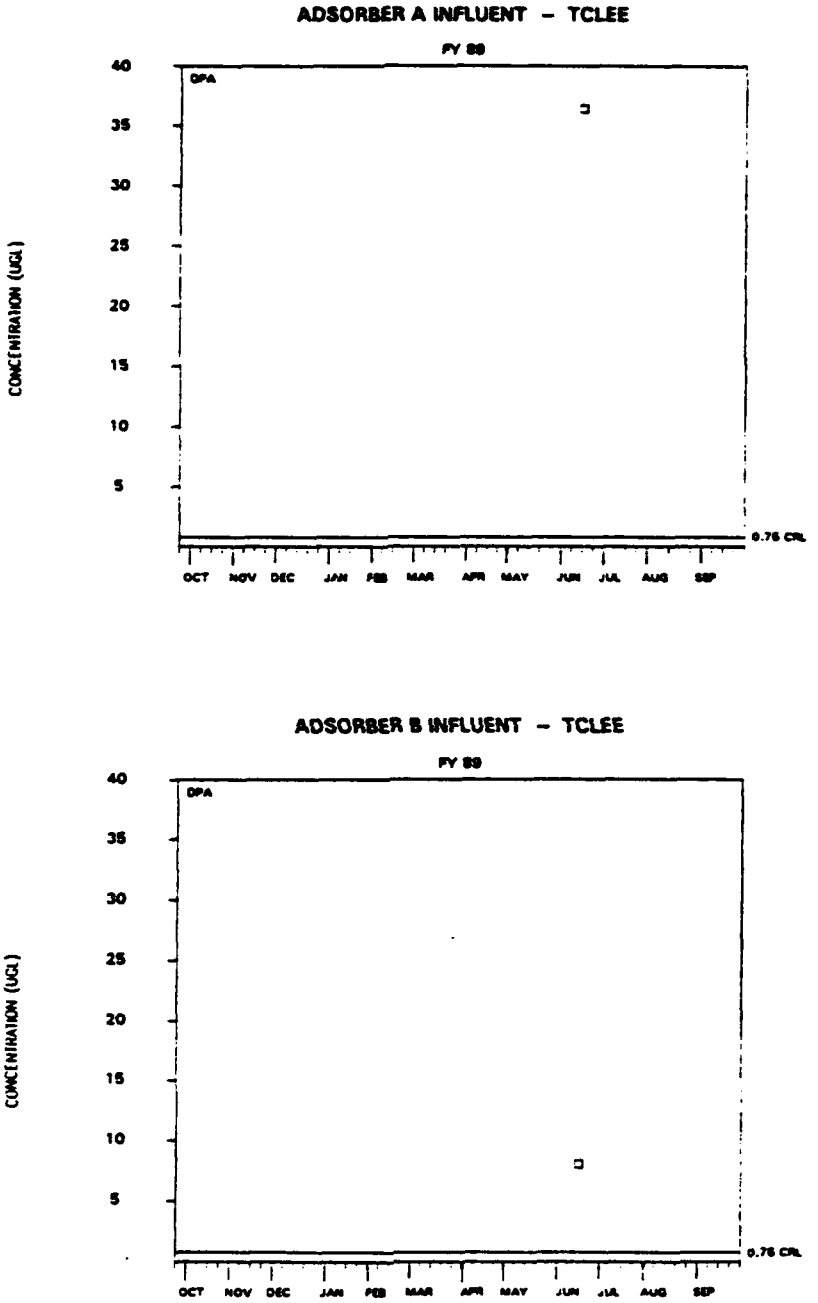


Figure 31. FY89 Tetrachloroethylene concentrations (Continued)

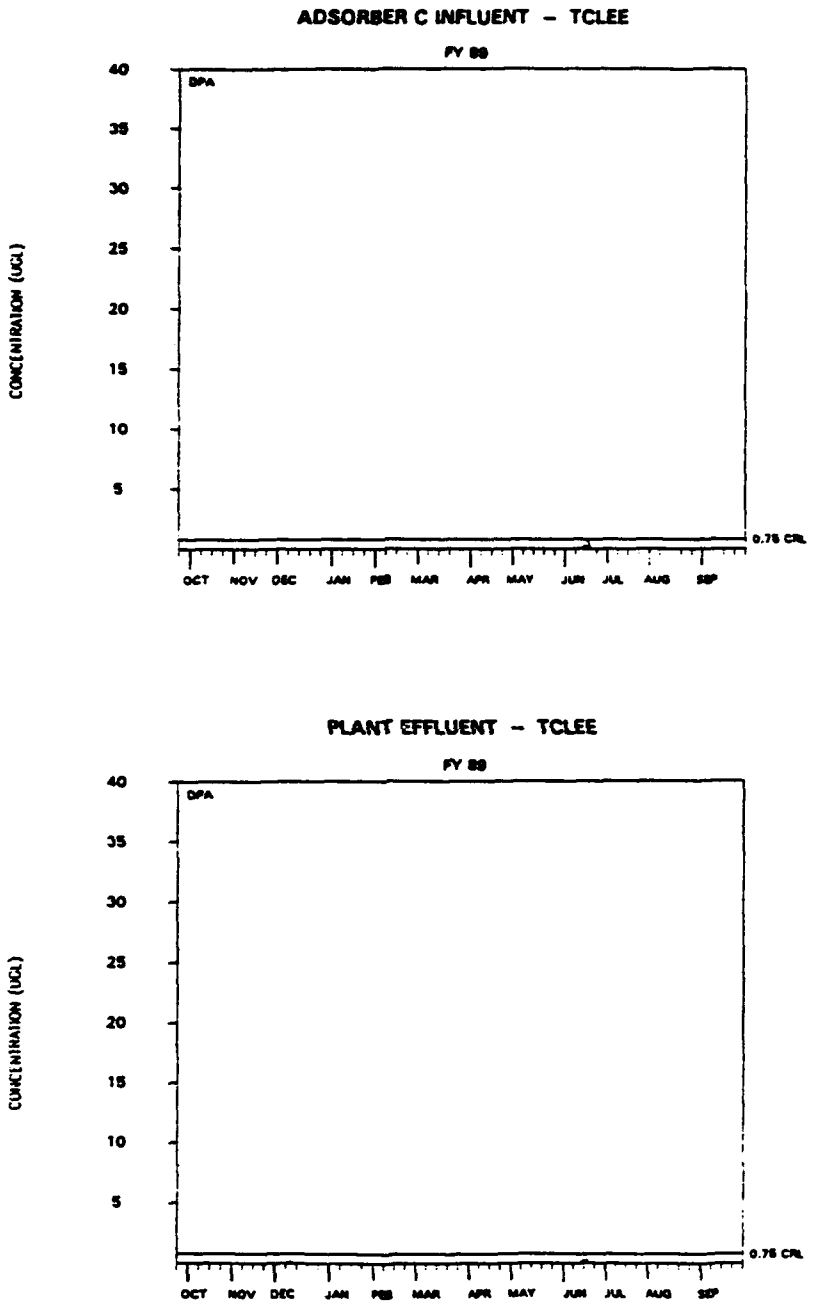


Figure 31. FY89 Tetrachloroethylene concentrations (Concluded)

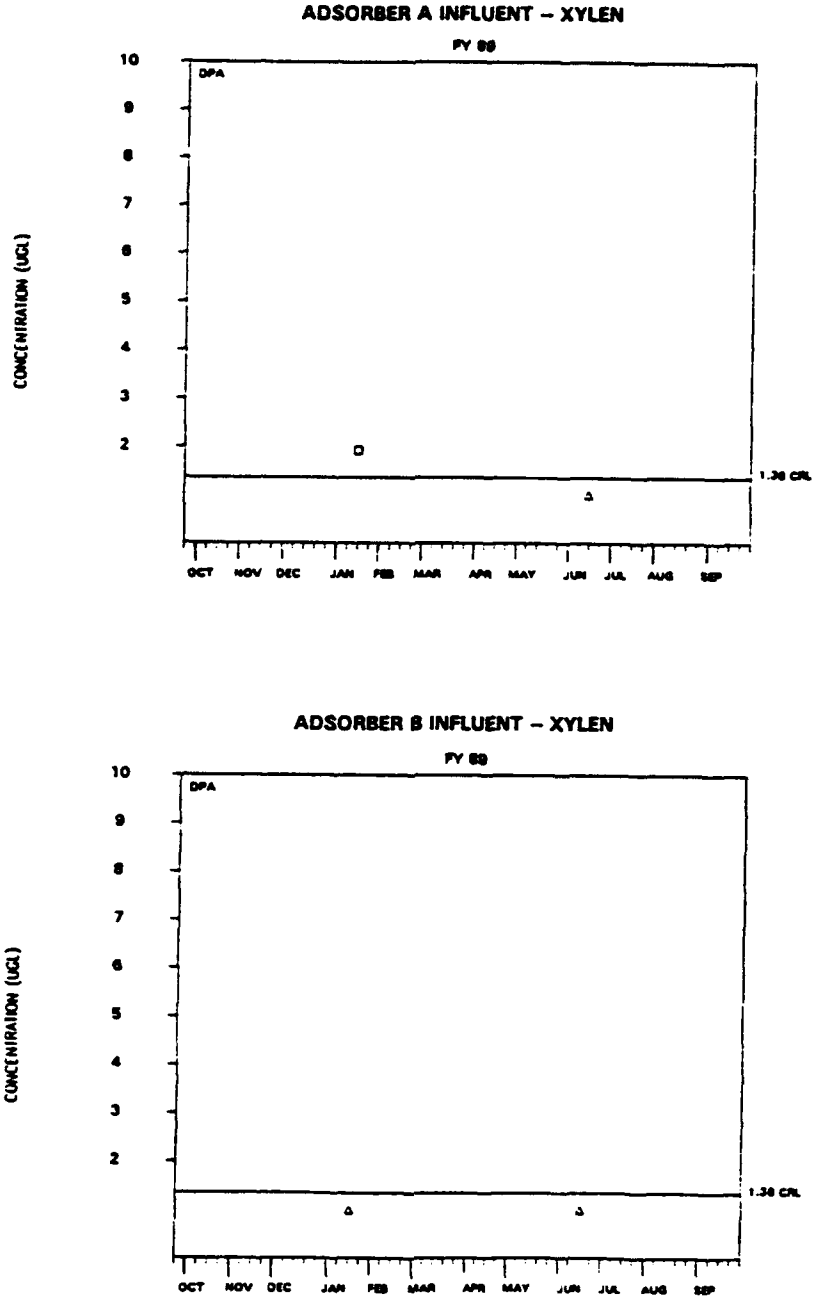


Figure 32. FY89 Xylene concentrations (Continued)

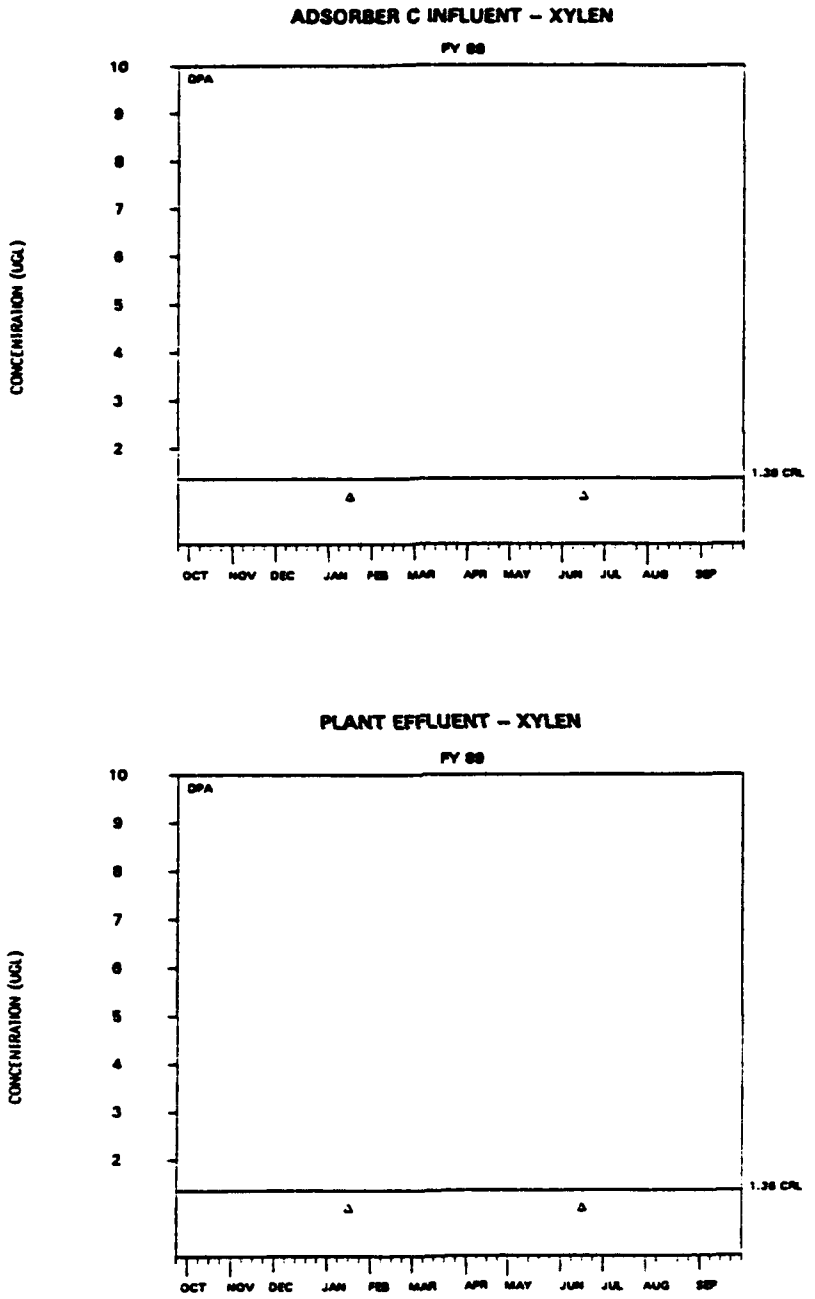


Figure 32. FY89 Xylene concentrations (Concluded)

DIMP were found in the influent to adsorber B in excess of their respective detection levels. No concentrations of contaminants above their respective detection levels were reported in the samples of influent to adsorber C or plant effluent. All the contaminants identified in the GC/MS analysis at concentrations above their respective detection levels are being analyzed for on a routine basis.

Summary of System Effluent Water Quality Data

47. The NBS treatment plant was very successful in removing organic contaminants from the ground water treatment during FY89. Of the organics analyzed for, only DIMP was routinely found in the plant effluent at concentrations above the CRL. DIMP is used as an indicator compound for determining when to add fresh carbon to the adsorbers. The DIMP concentration in the effluent never exceeded the MOL. Of the other organics, dieldrin and chloroform were each found in one sample during FY89 at concentrations above the CRL. The concentration of dieldrin found was also above the MOL. No other concentrations of dieldrin above the CRL were found in the effluent samples during the year. Chloroform was only analyzed for twice during the year with one sample having a concentration above the CRL. No MOL has been established for chloroform.

Contaminant Mass Removal

48. A calculation of the total mass of contaminants removed by the NBS treatment system during FY87, FY88, and FY89 was conducted by the Technical Operations Division as part of a multi-year study on all the water treatment systems in operation at RMA. A summary of the results from this study for the NBS is presented in Table 5. The amount of contaminant removed is given in pounds with a total for FY87, FY88, and FY89 of approximately 240, 435, and 336 pounds respectively. The contaminants with the largest amounts removed include the combined organo-sulfur compounds, DCPD, DIMP, and tetrachloroethylene. The calculations were conducted using a simple mass balance. Average annual effluent concentrations were subtracted from influent concentrations. Values less than the detection limits or CRL were treated as zero. The calculated values vary between years depending primarily on the average influent concentrations of the contaminants.

Table 5

North Boundary System Contaminant Removal, FY87-FY89

Contaminant	Abbreviation	FY87	FY88	FY89
1,2-Dichloroethane	12DCLE	3.26	0.07	1.00
Carbon Tetrachloride	CCL4	5.94	7.41	0.58
Chloroform	CHCL3	9.44	9.10	4.52
Combined Organo-Sulfurs	CPMSOX	5.97	20.10	20.58
Dibromochloropropane	DBCP	0.61	0.34	0.28
Dicyclopentadiene	DCPD	47.94	110.67	78.22
Diisopropylmethylphosphonate	DIMP	149.74	247.26	197.38
Dithiane	DITH	0.55	5.90	4.57
Tetrachloroethylene	TCLEE	14.04	30.48	9.83
Other organics		2.58	3.73	19.05
	Totals	240.07	435.06	336.01

Carbon Usage

49. A summary of the data on carbon usage in the NBS treatment plant for FY89 is presented in Table 6. Almost 201,000 pounds of activated carbon were used in FY89 with approximately 61 percent of the total usage in adsorber A, 37 percent in adsorber B, and 2 percent in adsorber C. Total carbon used for adsorber A was slightly lower than for FY88. Total carbon used in adsorbers B and C for FY89 was somewhat higher than for FY88. The average annual carbon usage rate in FY89 was 1.5 pounds per 1,000 gallons of waste treated which was identical to the average usage rate in FY88.

Table 6

FY89 Carbon Usage in the NB Treatment Plant

Adsorber	Total Annual Usage (lbs)	Annual Usage Rate lbs/1,000 (gal)
A	123,859	4.82
B	73,713	1.71
C	3,094	0.05
TOTAL	200,666	1.50

Contaminant Concentrations in Dewatering Wells

50. In order to provide a picture of the distribution of contaminants in the area of the control system, contaminant concentrations found associated with each alluvial dewatering well were graphed with respect to the well number along the dewatering well line. Thus, each graph provides a visual representation of a particular contaminants distribution along the length of the system. Based on the availability of data, graphs were developed only for aldrin, chloride, combined organo-sulfur compounds, DBCP, DCPD, DIMP, dithiane, dieldrin, endrin, fluoride, isodrin, and oxathiane for FY89. These graphs are presented in Figures 33 through 44. The well numbers are plotted in physical order from west to east. Each graph presents the data collected for each well during the year. The vertical lines associated with each well number represent the range of concentrations found (maximum and minimum) with the mean values for each well connected by a dotted line. A mean value was only computed for sets of data where 70 percent or more of the readings were above the CRL. When this criterion was met, values falling below the CRL were made equal to the CRL and included in the computations. A single triangle indicates that all values were below the CRL. A statistical summary of all the data used to develop the graphs is presented in Appendix C. It should be noted that the maximum number of samples collected from each well was five with only two samples collected in some cases.

Aldrin

51. During FY89, the highest concentrations of aldrin (Figure 33) were found along the western half of the control system with a maximum concentration of 0.67 ppb found associated with well No. 4. The majority of the concentrations found above the CRL were associated with wells in the area of the original North Boundary System. No concentrations above the CRL were found associated with wells east of well No. 11. The distribution of aldrin along the dewatering well line in FY89 was very similar to that found in FY88.

Chloride

52. In FY89, the highest concentrations of chloride (Figure 34) were found centered around well No. 4 with another smaller peak around well No. 33 in the western half of the control system. The maximum concentration found was approximately 1600 ppm. The chloride concentrations associated with the wells east of well No. 11 were generally below 200 ppm. The distribution and

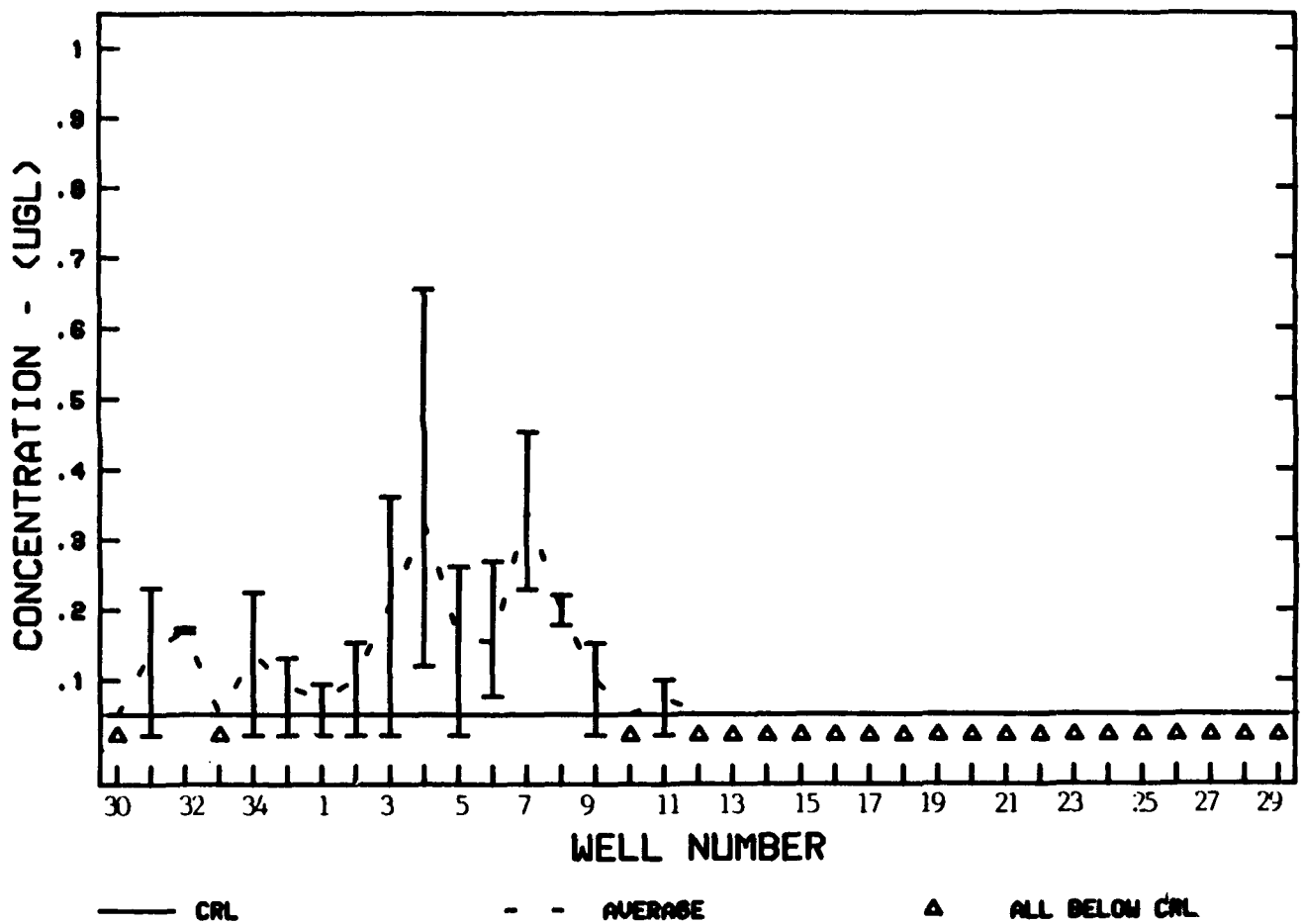


Figure 33. FY89 Aldrin concentrations in NBS dewatering wells.

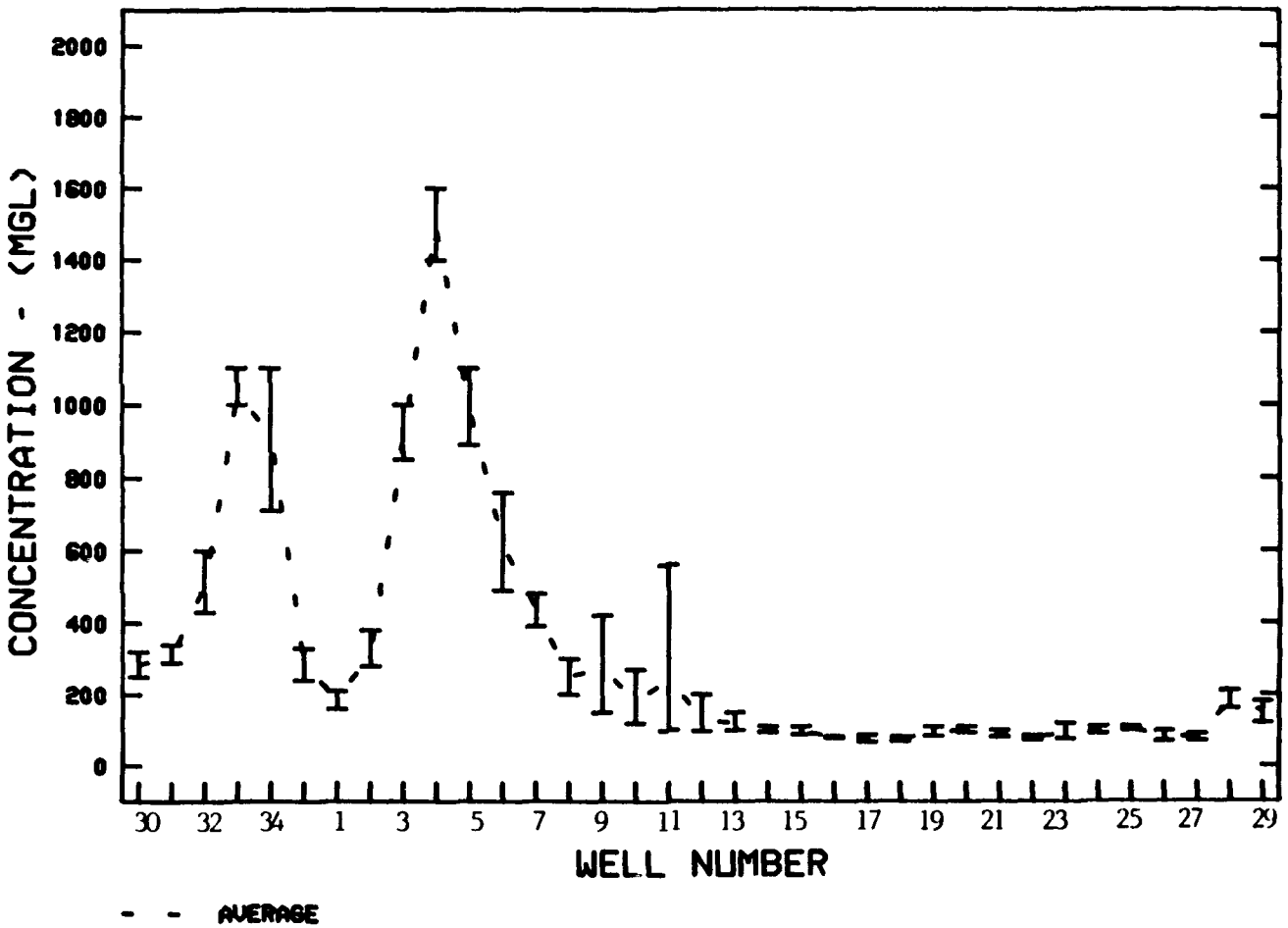


Figure 34. FY89 Chloride concentrations in NBS dewatering wells.

concentrations of chloride found in FY89 were nearly identical to those in FY88.

Combined Organo-Sulfurs

53. Concentrations of the organo-sulfur compounds (Figure 35) above the CRL were found in FY89 primarily in the west-central portion of the system. The maximum concentrations were found associated with well No.'s 4 through 6 with a maximum concentration of approximately 500 ppb in well No. 6. No concentrations above the CRL were found associated with wells east of well No. 12. The distribution of the organo-sulfurs along the dewatering well line in FY89 was very similar to that found in FY88. However, the concentrations found in FY89 were somewhat higher than those reported in FY88.

DBCP

54. During FY89, the maximum concentrations of DBCP (Figure 36) were found associated with well No.'s 6 through 11 with a maximum concentration of approximately 3.5 ppb found in well No. 8. Essentially all the wells east of well No. 16 and west of well No. 5 produced no samples with DBCP concentrations in excess of the CRL. The distribution and concentrations of DBCP found in FY89 were nearly identical to those in FY88.

DCPD

55. The highest concentration of DCPD (Figure 37) found in FY89, approximately 1000 ppb, was associated with well No. 4. The concentrations found in excess of the CRL were associated with wells in the area of the original NBS. None of the wells east of well No. 12 or west of well No. 2 produced samples with DCPD concentrations in excess of the CRL. The distribution of DCPD along the dewatering well line in FY89 was very similar to that found in FY88. The maximum concentrations found in FY89 were slightly lower than those found in FY88.

DIMP

56. During FY89, concentrations of DIMP (Figure 38) above the CRL were found in some samples collected from all the dewatering wells. The maximum concentrations were found centered around well No.'s 1 through 7 with a maximum concentration found of approximately 1300 ppb. The distribution of DIMP along the dewatering well line in FY89 was very similar to that found in FY88. The maximum concentrations found in FY89 were slightly lower than those found in FY88.

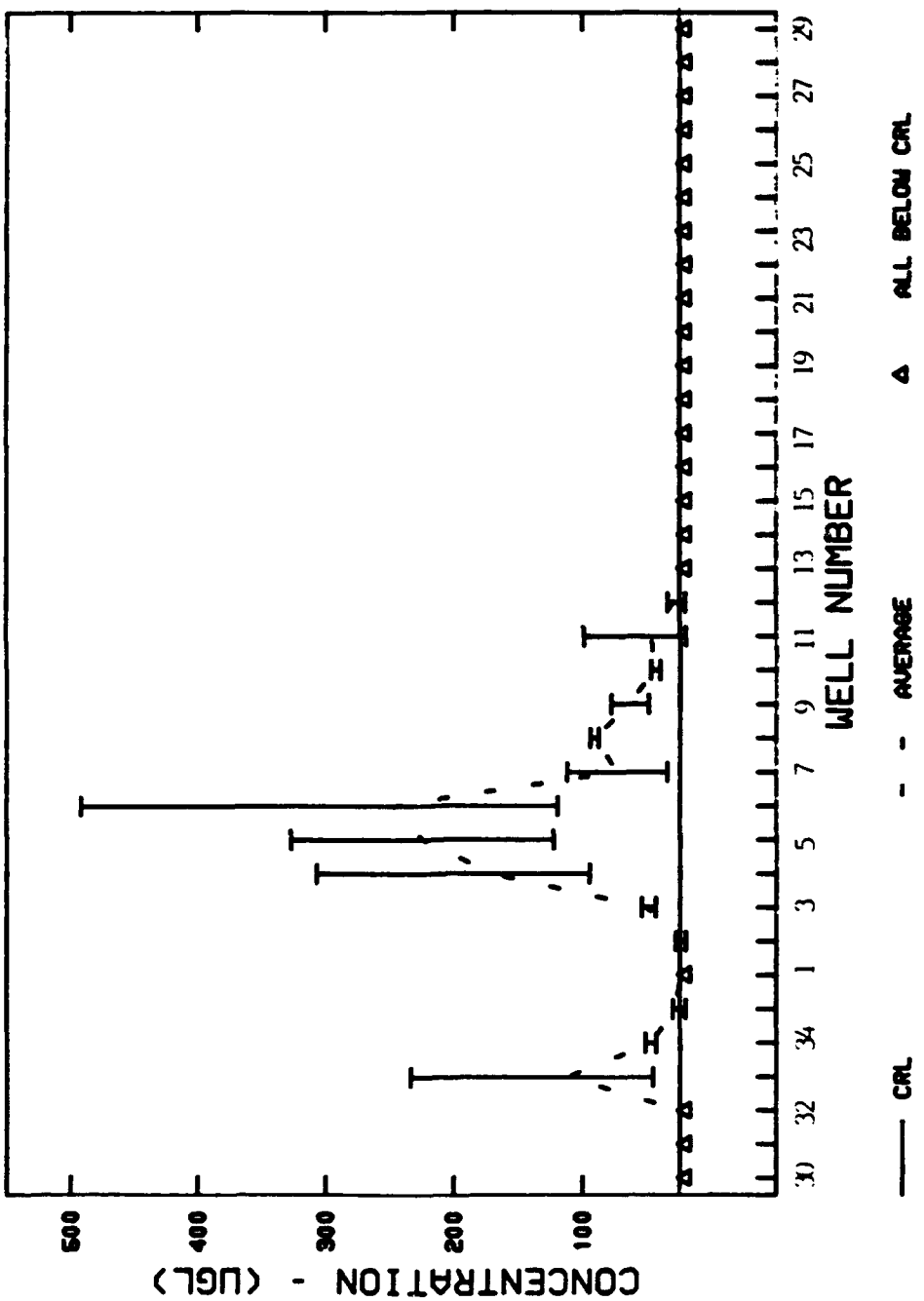


Figure 35. FY89 Combined Organo-Sulfurs concentrations in NBS dewatering wells.

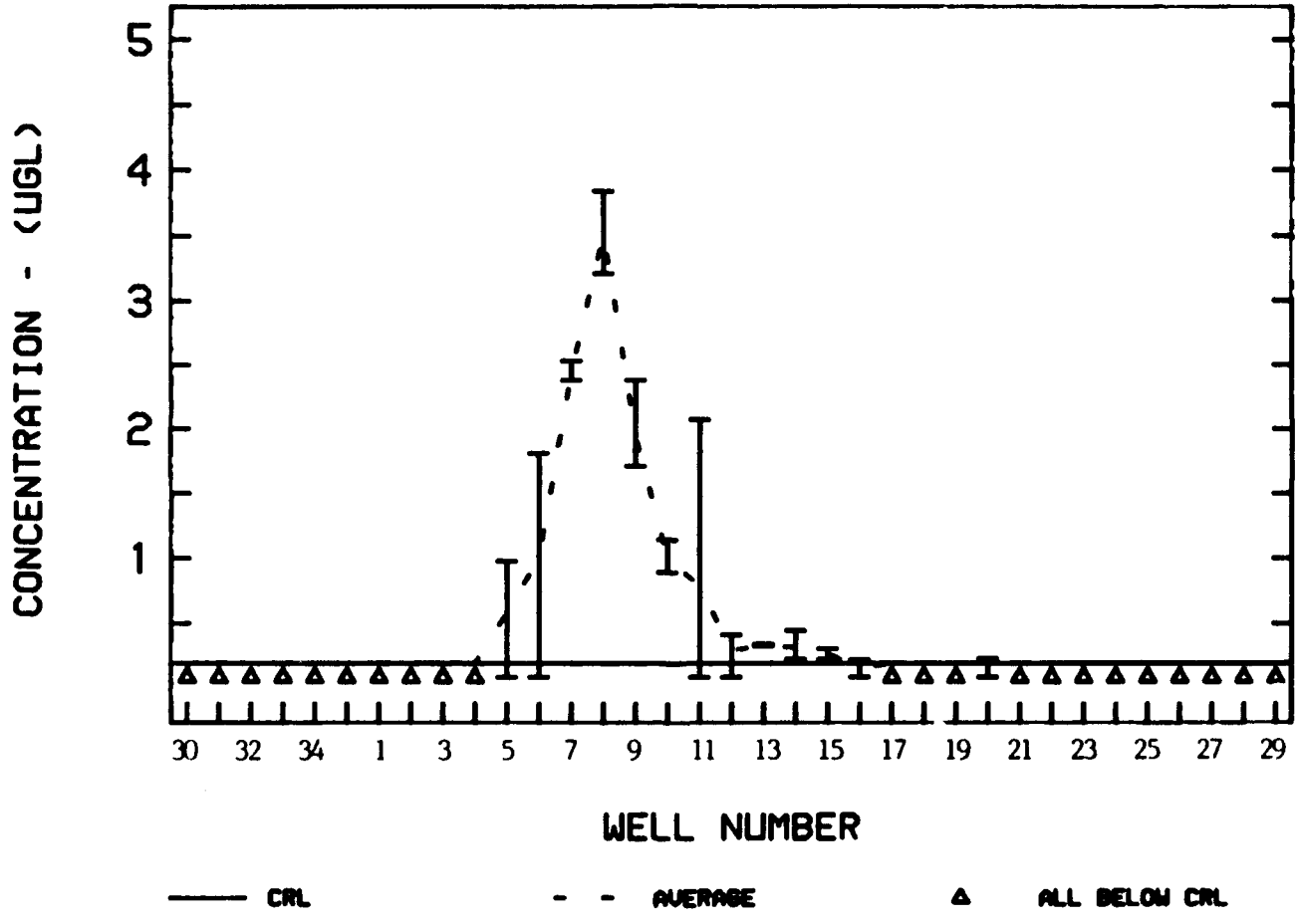


Figure 36. FY89 Dibromochloropropane (DBCP) concentrations in NBS dewatering wells.

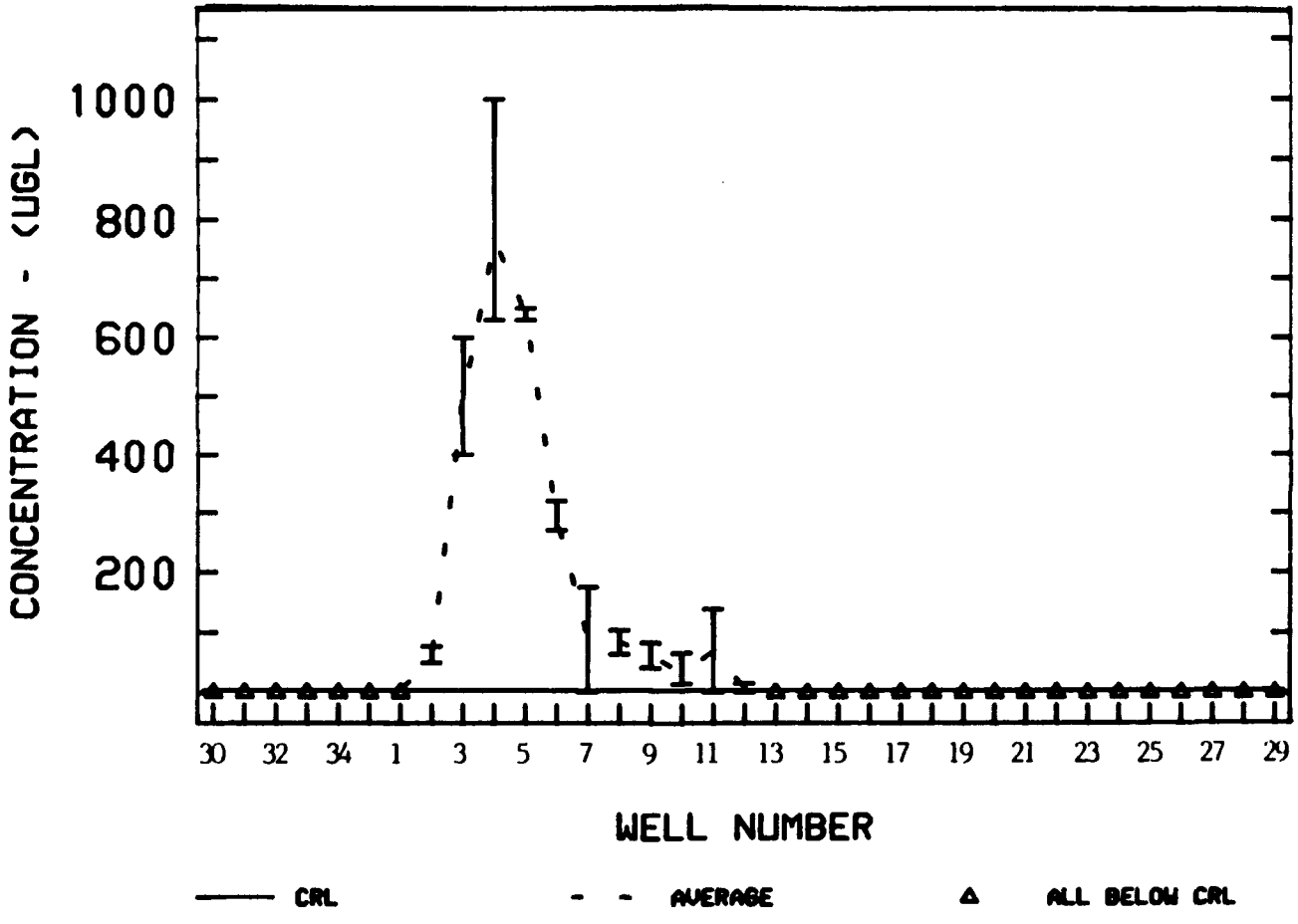


Figure 37. FY89 Dicyclopentadiene (DCPD) concentrations in NBS dewatering wells.

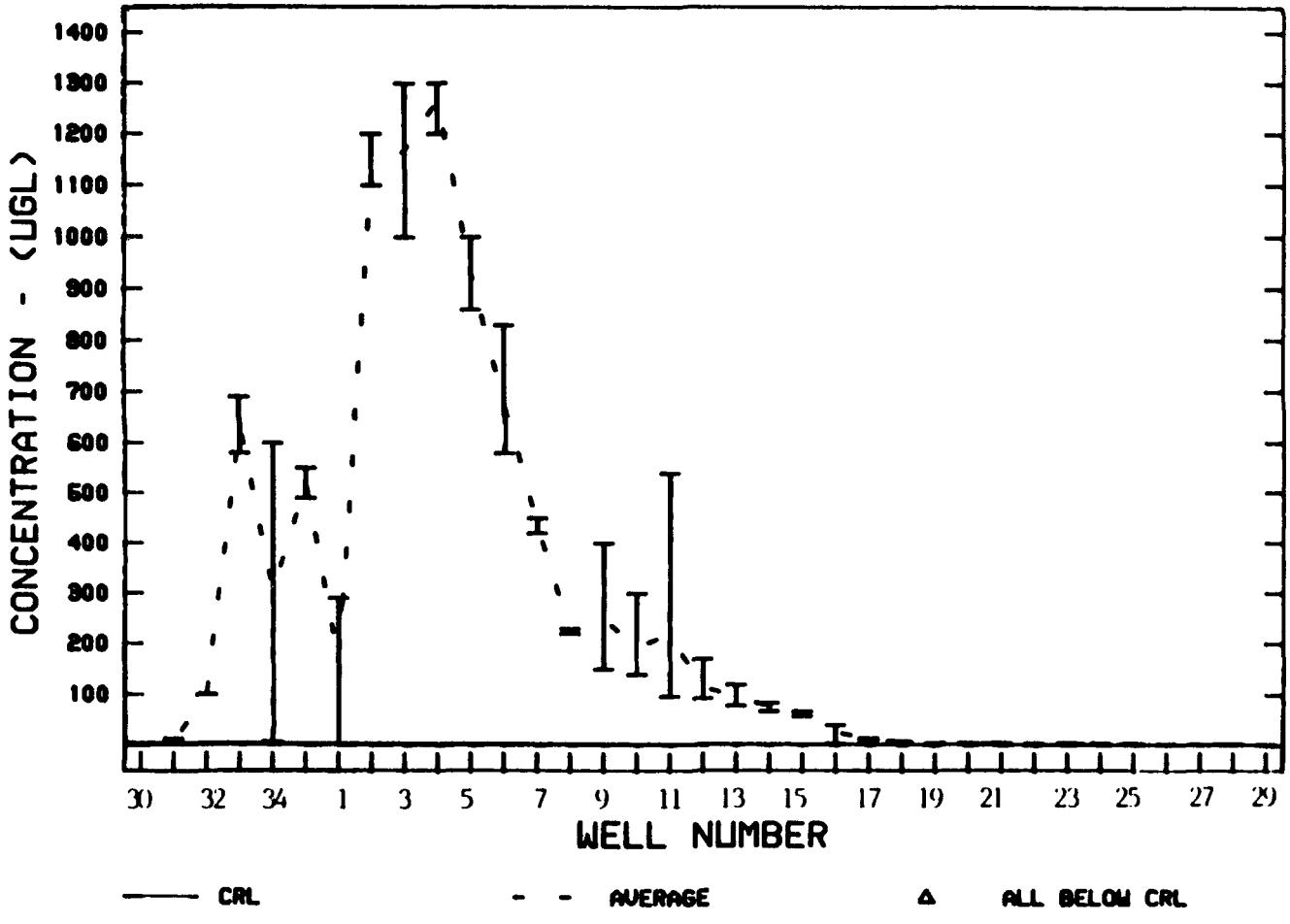


Figure 38. FY89 Diisoproplymethylphosphonate (DIMP) concentrations in NBS dewatering wells.

Diathiane

57. Concentrations of diathiane (Figure 39) above the CRL were found in FY89 along the western part of the dewatering well line. The maximum concentration was found associated with the well No. 4 at approximately 78 ppb. Concentrations above the CRL were found distributed between well No.'s 31 and 11. No concentrations above the CRL were found associated with the wells east of well No. 11. Diathiane in the dewatering wells was not reported in FY88 and thus no comparison could be made.

Dieldrin

58. During FY89, concentrations of dieldrin (Figure 40) above the CRL were found associated with a variety of dewatering wells all along the boundary with the exception of the last few wells on the east end. The highest concentrations were centered around well No.'s 2 through 10 with a maximum concentration of 7.8 ppb for well No. 2. The distribution and concentrations of dieldrin found in FY89 were nearly identical to those found in FY88.

Endrin

59. Concentrations of endrin (Figure 41) above the CRL were found in FY89 primarily in the west and central portions of the system. The highest concentrations were centered between well No.'s 2 and 11 with a maximum concentration found of approximately 3.8 ppb. No concentrations above the CRL were found associated with the wells east of well No. 22. The distribution of endrin along the dewatering well line in FY89 was very similar to that found in FY88. The maximum concentrations found in FY89 were somewhat lower than those in FY88.

Fluoride

60. In FY89, a general decreasing trend in fluoride concentrations (Figure 42) was found from west to east along the dewatering well line. The maximum concentration of fluoride, in excess of 9 ppm, was found associated with well No. 4. The average concentrations found associated with the wells generally ranged from 2 to 7 ppm. The distribution and concentrations of fluoride found in FY89 did not vary significantly from those found in FY88.

Isodrin

61. During FY89, isodrin concentrations (Figure 43) above the CRL were found associated with wells located along the western portion of the system. A maximum concentration of approximately 1 ppb was found associated with well No. 34, but lessor peak concentrations were found associated with well No.'s 4, 7, 11, and 14. No concentrations above the CRL were found associated with

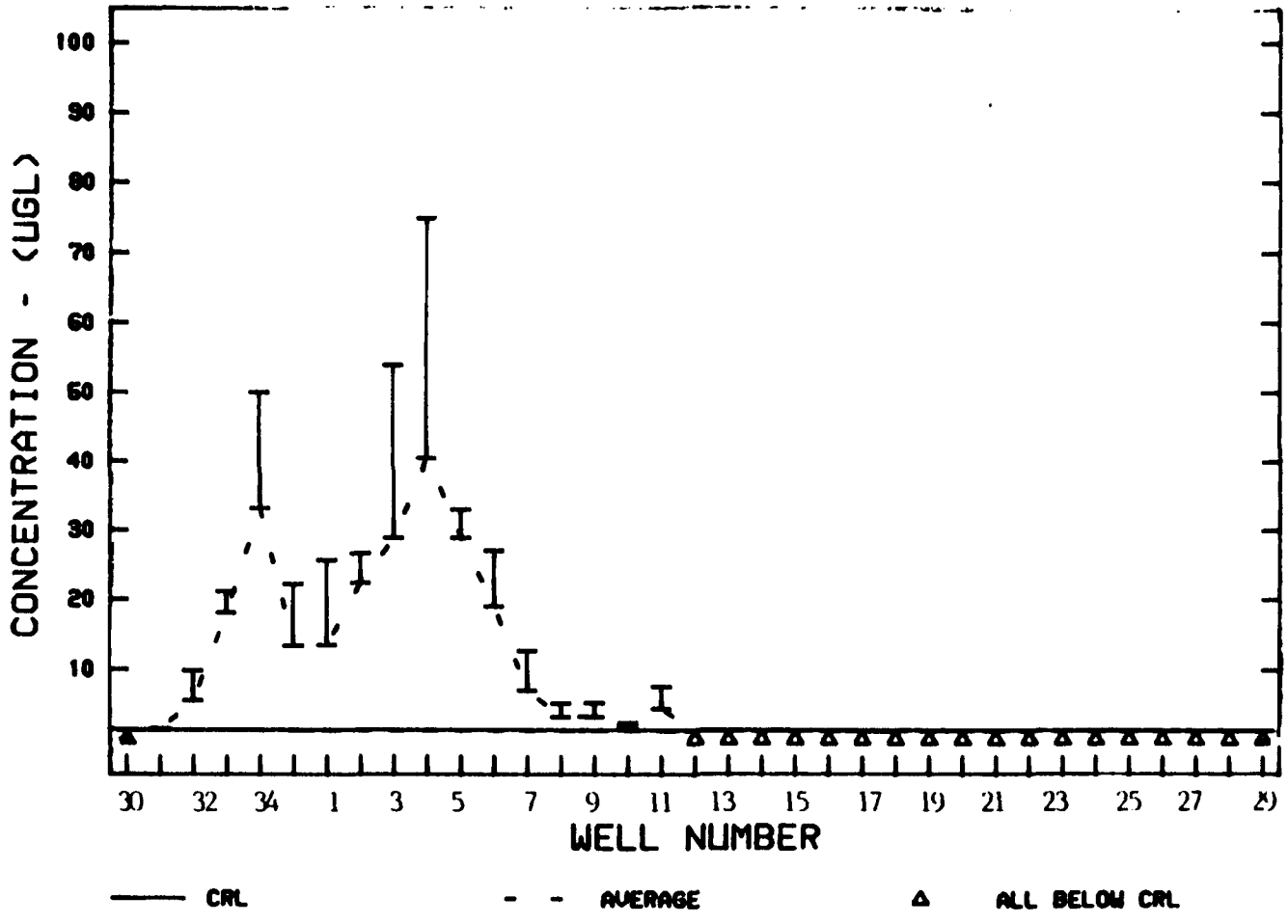


Figure 39. FY89 Diathiane (DITH) concentrations in NBS dewatering wells.

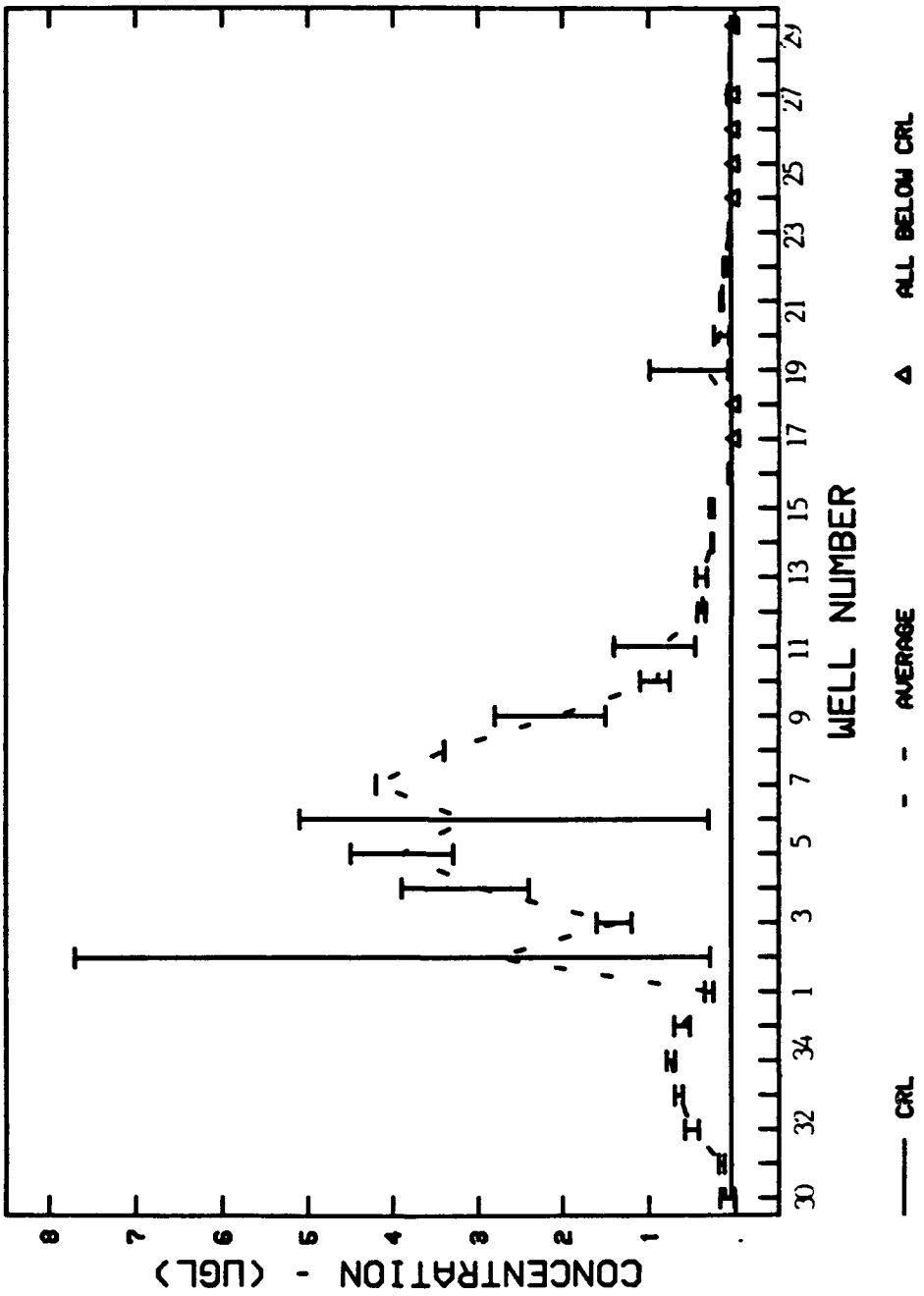


Figure 40. FY89 Dieldrin concentrations in NBS dewatering wells.

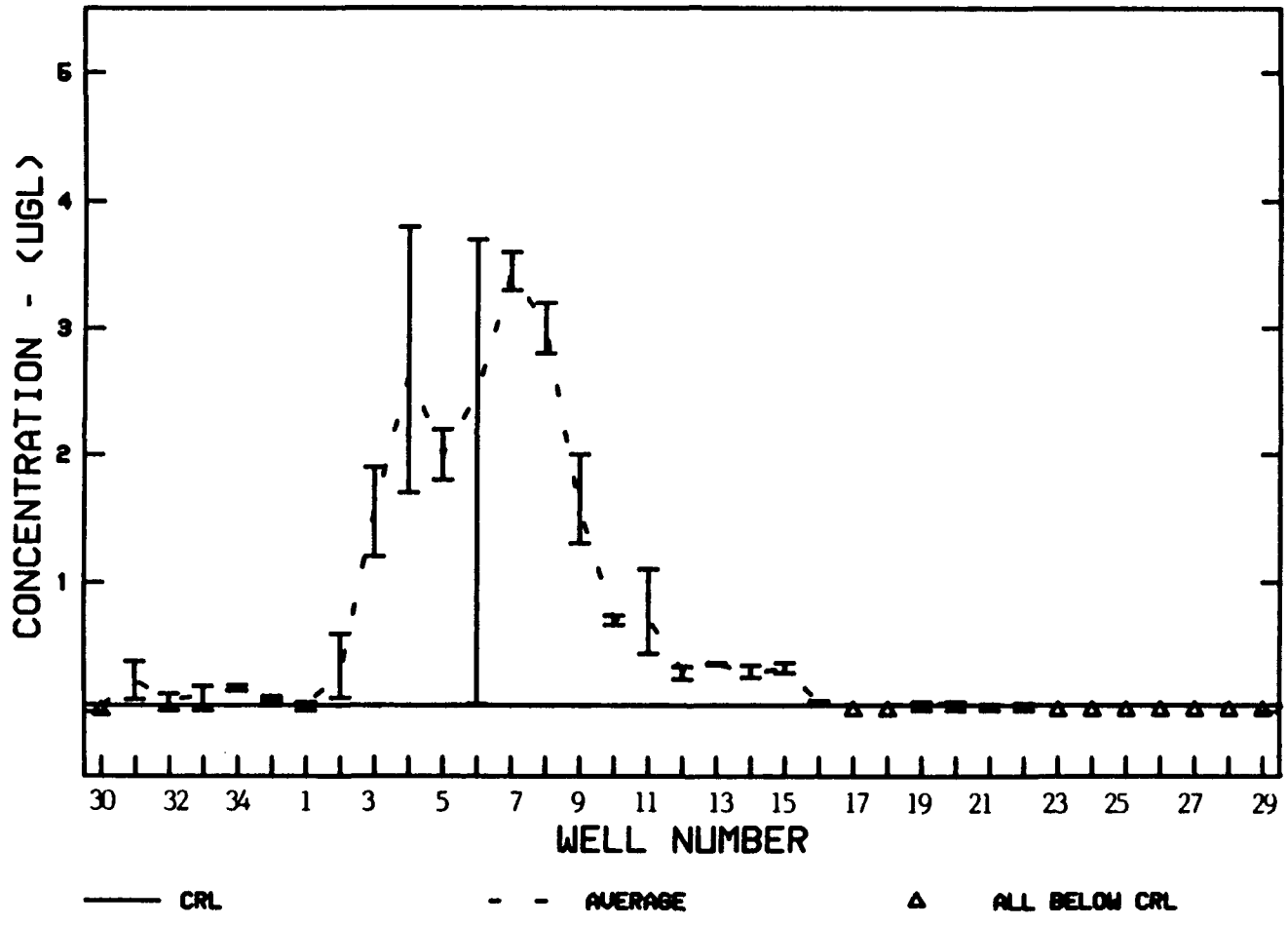


Figure 41. FY89 Endrin concentration in NBS dewatering wells.

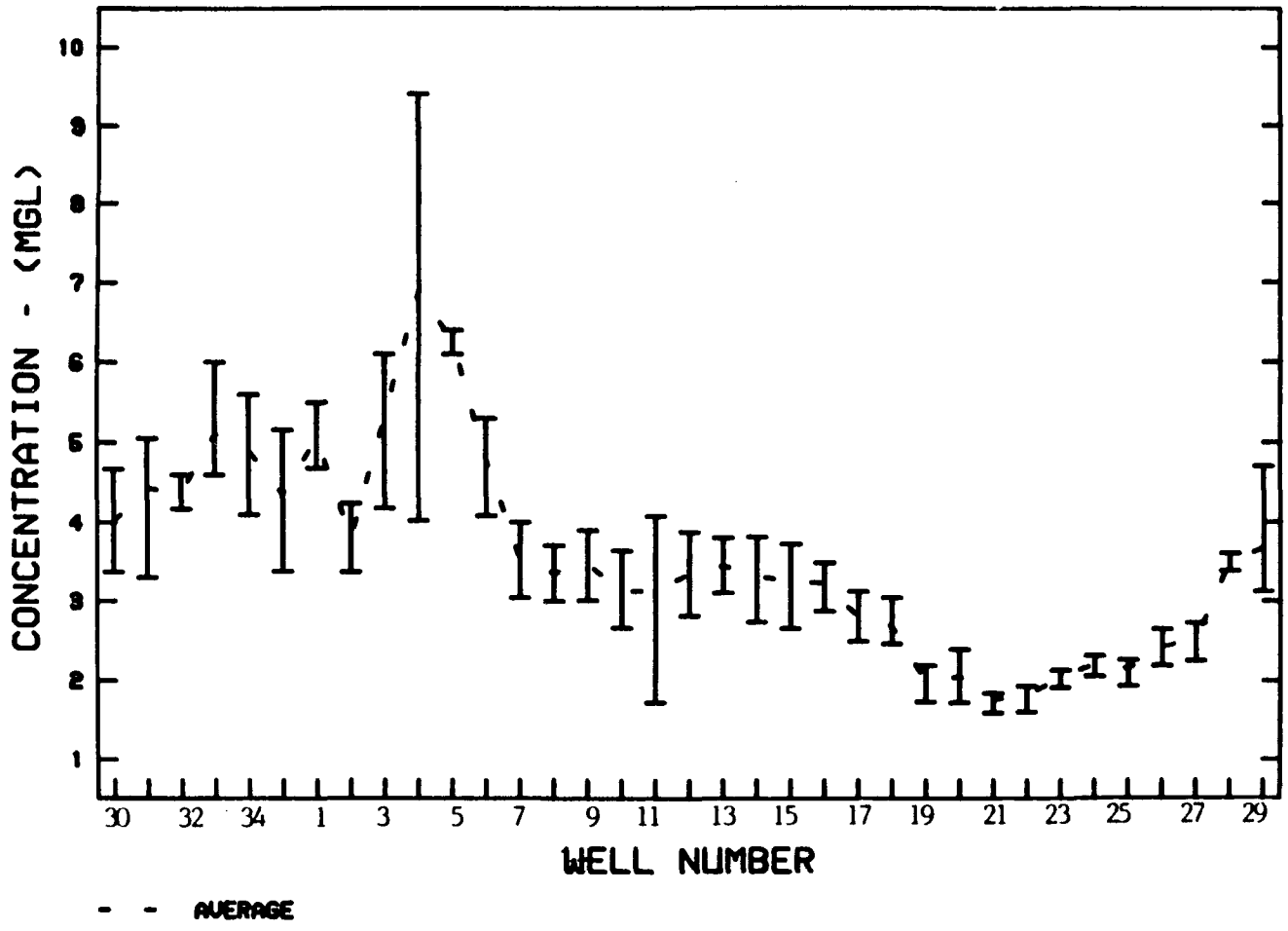


Figure 42. FY89 Fluoride concentrations in NBS dewatering wells.

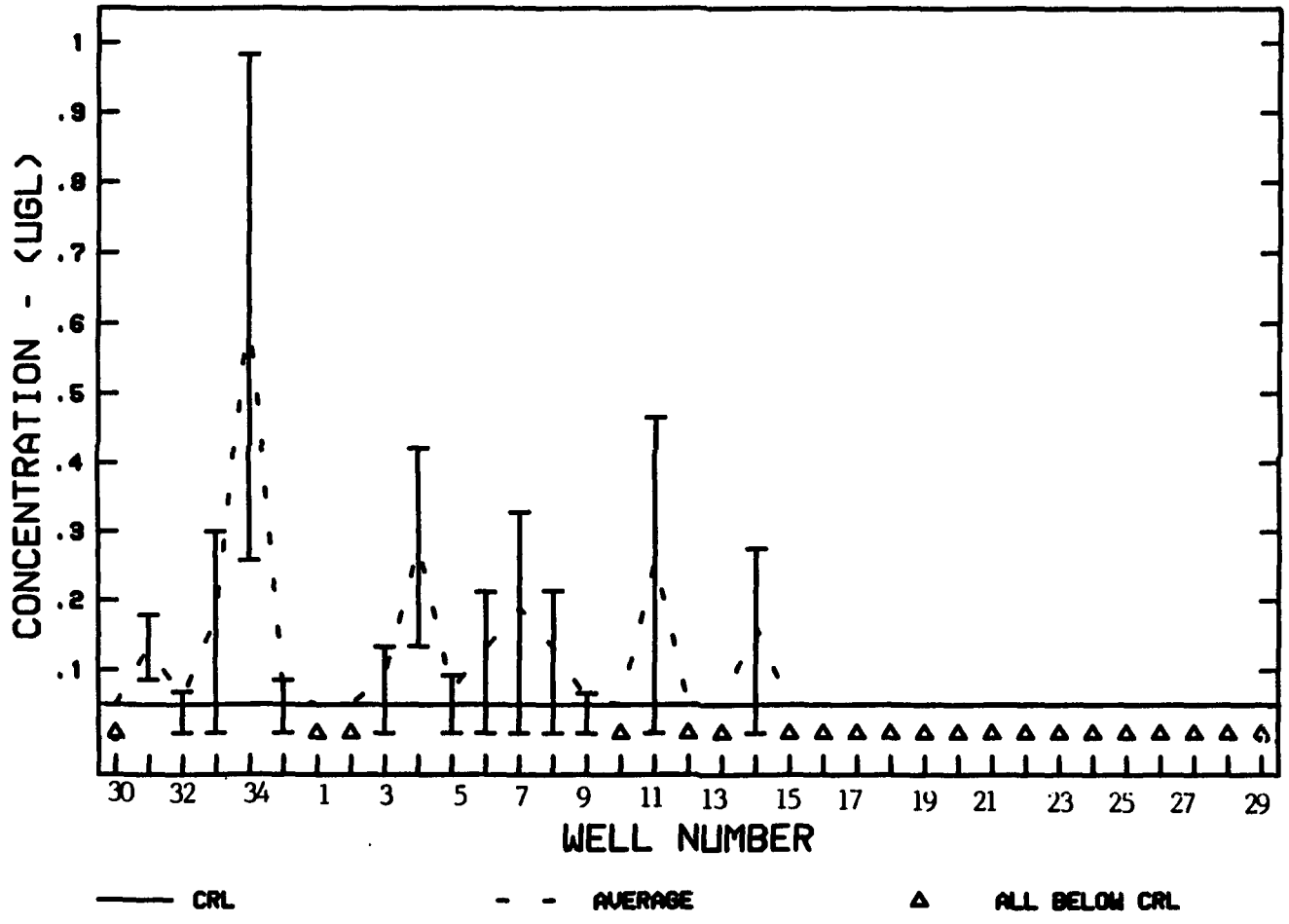


Figure 43. FY89 isodrin concentrations in NBS dewatering wells.

any wells east of well No. 14. No graph of isodrin concentrations in the dewatering wells was prepared for FY88 and thus no comparison could be made.

Oxathiane

62. Oxathiane concentrations (Figure 44) above the CRL in FY89 were distributed between well No.'s 33 and 7 with a maximum concentration of 9.5 ppb found associated with well No. 4. No concentrations of oxathiane above the CRL were found associated with any wells west of well No. 31 or east of well No. 7. No graph of oxathiane concentrations in the dewatering wells was prepared for FY88 and thus no comparison could be made.

Summary of Dewatering Well Data

63. Based on the contaminant concentration data collected for the dewatering wells during FY89, it appears that the highest concentrations of contaminants were generally found along the western half of the control system in the area of the original North Boundary System. The maximum concentrations of the various contaminants found were generally associated with well No.'s 34 through 10. In general, the contaminant distributions did not change significantly between FY88 and FY89. The data indicate some slight decreases in maximum concentrations for some of the contaminants.

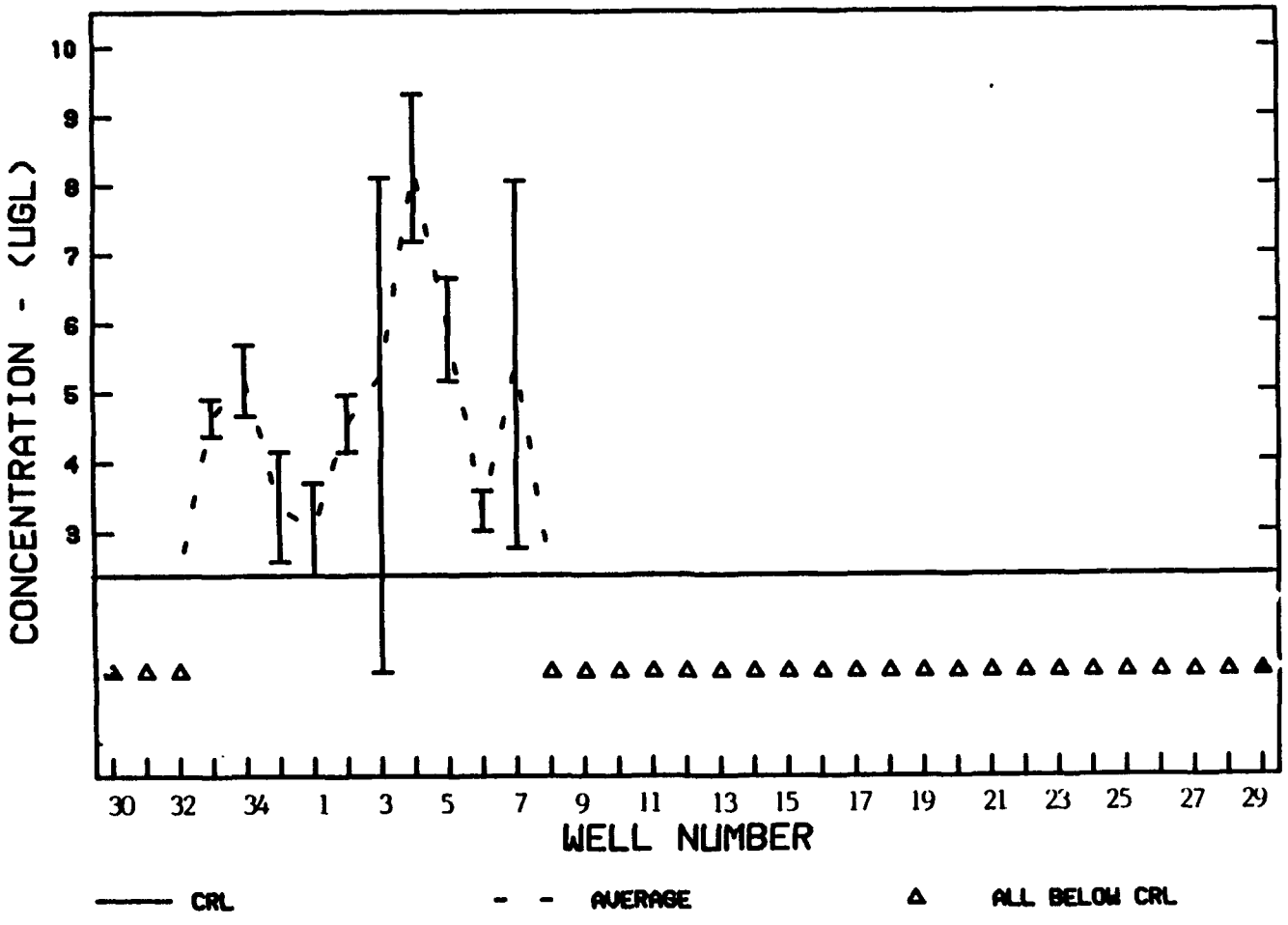


Figure 44. FY89 Oxathiane (OXAT) concentrations in NBS dewatering wells.

PART IV: NEW TRENCH SYSTEM

General

64. Ten gravel-filled trenches were installed in the fall 1988 as an interim remedial action to improve the capacity for recharging the treated ground water. An implementation document (RIC 89139R01) is on file at the RIC. The description of the system and its start-up performance given below is summarized from Lutton (1989).

Design and Construction

65. The design consists of gravel-filled trenches penetrating into the alluvial aquifer stratum. Recharge water is fed longitudinally through a perforated plastic pipe near the top of the gravel interval. A filter fabric sheet separates the gravel interval from silty soil placed to the surface as backfill above. The fabric also protects against lateral intrusion of silt as the water level fluctuated. Ten separate trenches were suggested to facilitate maintenance and control. Trench width is about 3 ft, depth about 16 ft, length 160 ft, and offset from the NBS barrier 45 ft.

66. Part of the design was focused on potential problems of instability when excavating into locally saturated, cohesionless soil. A sequence of steps in construction was recommended to facilitate rapid placement of gravel and reduce the stand-up time for precariously high trench walls.

67. When the trenches were constructed in the fall 1988, they encountered no unresolvable problems. Relative stability of trench wells was at least in part due to the fact that the water level was low and seldom much above bedrock, the ultimate depth of trenching. Hence, problems with saturation and concomitant weakening of soil were minor.

Operation

68. The distribution of treated water has been changed with the installation of the trenches. Previously only about 50 to 60 GPM could be recharged through the wells in the western half of the NBS. After the trenches began operating, the recharging to the same western portion of the NBS was as great as 200 GPM. By the middle of January the system approached limiting water

levels imposed by the bottoms of system manholes. Accordingly, trench flow rates were reduced in anticipation of a condition of more or less stabilized flow.

69. The rate of trench recharging was varied through start up approximately as follows:

Date	GPM
Oct 31	Start
Nov 3	46
Nov 9	123
Nov 29	177
Dec 7	194
Feb 10	173
Mar 3	157

A substantial raising of the water table was achieved even in the first month (Figure 45).

70. Subsequent trench flow rates as indicated by spot flow-meter readings were approximately as follows:

Date	GPM
Mar 29	154
May 18	100
Jun 26	89
Aug 24	86

Trench flow at the end of FY89 was approximately 84 GPM as indicated by meter readings on October 6, 1989. Flow decreases made in the 3rd and 4th quarter made more water available to the eastern half of the system and reduced the unnecessarily high favorable (southward) gradient across the barrier on the west.

Evaluation

71. The performance of trenches will be largely reflected in service life which in turn depends on a continuance of high flow through the trenches and immediately adjacent aquifer. Calculated permeability values provide a means of evaluating this performance. The permeability k of the trench-aquifer system was calculated upon stabilization of flow in the third quarter (Lutton 1989) based on the equation:

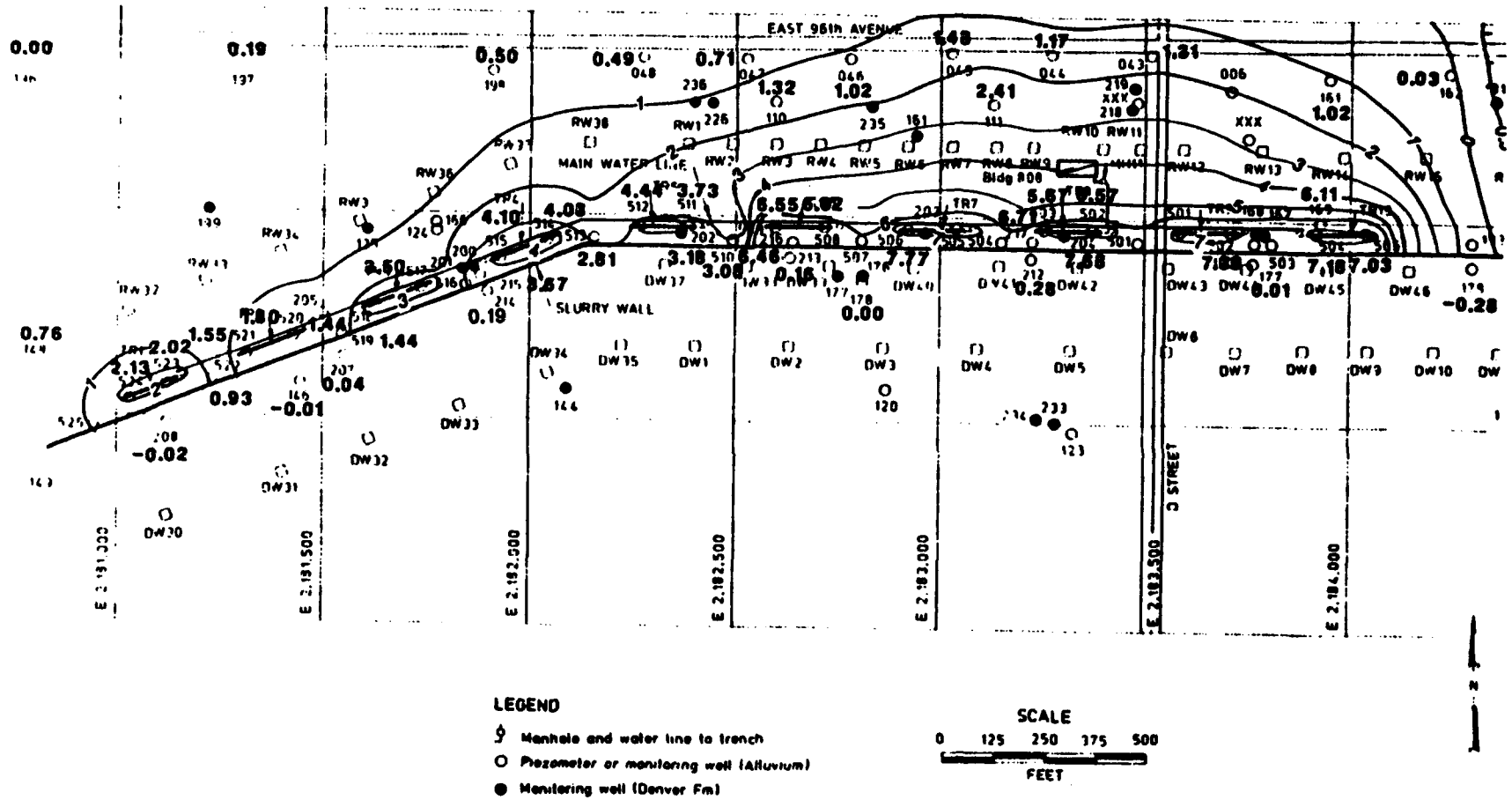


Figure 45. Level changes (ft) in alluvial ground water from trench recharging during November 1988 (Lutton 1989)

$$k = \frac{Q}{Ai}$$

72. A similar analysis of system permeability was performed for water levels and rates in late August five months later. Parameters were:

Q = quantity of water per unit time
= 86 GPM or 11.498 ft^3/min

A = cross-sectional area through which Q flows
= 8,600 ft^2

i = hydraulic gradient
= 0.00979

The area A was substantially reduced in the 5-month interval by an average 4.0-ft drop in the water table. The coefficient of permeability calculated for August was 6.94×10^{-2} cm/s, i.e. somewhat greater than had been calculated for March. In other words, no evidence of deterioration of recharging capability was found.

Microbiological Assessment of Recharge Trenches

73. On 14 and 15 August 1989, WES Environmental Laboratory personnel conducted microbiological and chemical sampling of recently established recharge trenches. The purpose of the sampling trip was to gather information for use in predicting possible future fouling (plugging) of the trenches due to growth of microorganisms in the trenches.

74. On 16 August 1989, microbiological and chemical (nutrients plus total organic carbon) samples were collected from Well TR-5, plus an additional chemical sample from well number 302, the offset well for this trench. The sampling team was unable to obtain samples from trenches TR-1, TR-2, and TR-3, the trenches having the lowest flow rates of the series, because water levels in these trenches were too low. The piezometer pipe at the east end of Trench TR-1 yielded only a limited amount of a syrupy slurry which appeared to be iron oxides suspended in water. A second series of microbiological and chemical samples were taken from trench TR-4, along with a chemical sample from well number 215, the offset well for this trench. TR-4, like TR-5, is a moderate flow trench. The last microbiological and chemical samples were obtained from trench TR-7, a high flow trench in the vicinity of trenches TR-4

and TR-5. A second chemical sample was obtained from offset well number 203, the offset well for trench TR-7. As determined by the M-48 flow analyzer located at the treatment plant, the flow rates for each of the trenches examined (whether sampled or not), in gallons per minute (gpm) on 16 August 1989 were:

TR-1 - 1.4 gpm
TR-2 - 0.0 gpm
TR-3 - 0.7 gpm
TR-4 - 4.5 gpm
TR-5 - 4.7 gpm
TR-7 - 25.8 gpm

75. Immediately after collection, each sample was labelled, packed on ice and placed in the shade. Samples were processed within 4-6 hours of collection. The microbiological samples from trenches TR-7 and TR-5 developed a reddish orange precipitate during the interval between sampling and sample processing. Although the material was not analyzed, a precipitate of this color typically occurs when water containing reduced iron is exposed to air.

76. Sample processing consisted of diluting each sample several times and then using aliquots of each dilution series to inoculate various media for enumeration of specific groups of microorganisms. The types of media used were the same as those previously used for the recharge wells. Media included those specific for fermenters, aerotolerant heterotrophs, facultative anaerobes, and fungi. The medium for sulfate reducers was inoculated until upon return from the trip on 18 August 1989. Aliquots were also taken and preserved using 1 percent formalin for later direct microscopic enumeration with the acridine orange method. Positive results of the microbial assays using the various media are summarized in Table 7.

Table 7

Results of Microbial Assay

Trench Number	Fermenters per ml	Aerotolerant Heterotrophs/ml	Facultative Anaerobes/ml	Fungi per 100 ml
TR-4	130	1.3×10^3	4.5×10^4	8.2+/-1.6
TR-5	130	7.9×10^3	2.3×10^6	9.9+/-2.4
TR-7	2200	2.3×10^4	1.3×10^6	4.0+/-0.6

NOTE: No sulfate reducers were found.

77. Trenches TR-4 and TR-5 had similar flow rates (4.5 and 4.7 gpm, respectively), and while TR-4 had the lowest number of facultative anaerobes, both trenches had similar numbers of fermenters, aerotolerant heterotrophs, and fungi. By contrast, trench number TR-7 had the highest flow rate and also the largest numbers of fermenters and aerotolerant heterotrophs and the second largest number of facultative anaerobes, but the least number of fungi.

78. Compared with previous findings for the recharge wells, the levels of fermenters observed were generally within the lower portion of the range reported earlier. Values for aerotolerant heterotrophs were within mid-ranges reported in the recharge wells study. The values for facultative organisms in TR-5 and TR-7 were somewhat greater than those reported earlier for recharge wells. No figures for the fungi were reported, except to indicate that fungi were present at low levels in the recharge wells. The recharge trench findings agree with this observation.

79. The presence of iron oxides in trench TR-1 suggests that oxidizing conditions prevailed in this trench. The gradual development of iron oxides in samples from trenches TR-5 and TR-7 following removal indicates that moderately reducing conditions were present in the waters from these sources. If dissolved oxygen had been present in these waters, oxidized precipitates would have been visible upon removal of the samples from the trenches.

80. Generally, the limited results for the trenches differ from observations for the recharge wells; higher numbers of microorganisms were found in trenches with the higher flows, whereas an inverse relationship existed for the recharge wells. Although these results are only preliminary, these differences may be due to several factors. Trenches are physically different from wells. The two types of recharge system have different configurations, and there are differences in the flow patterns. The trenches have membranes lining the outer edge of the packing as opposed to the stainless steel screens surrounding the well packing material. The trenches had been in service for several months as opposed to several years for the recharge wells. Finally, the information needed to determine which, if any, of these factors may account for the observed differences was not available at the time of the field trip.

81. The observations that were reported for FY89 are as follows. Fungi were not present at levels high enough to warrant concern. The inability to detect the presence of sulfate-reducing bacteria indicates that either oxidizing or mildly reducing conditions were present in the trenches at the time of

sampling. This fact coupled with the presence of reduced iron in samples from trenches TR-7 and TR-5 suggests that mildly reducing conditions were present in these trenches. Observed levels of heterotrophic aerotolerant bacteria were within the normal range found in many ground-water wells. Fermenters, a type of facultative microorganisms, were present in low levels in all of the samples. One would expect to see the numbers of these microorganisms increase by several orders of magnitude in a trench that was experiencing flow problems at the time of sampling. The high numbers of facultative bacteria observed is significant in that these organisms generally require high levels of organic material in the water. The high levels of this type of organisms indicate a strong potential for eventual well fouling.

82. There are several factors that should be addressed in future work. All of the trenches should be sampled rather than only three (however, lack of water in the trenches does preclude sampling). An attempt should be made to sample other areas within the trench in addition to the piezometer tubes. The water in these tubes may or may not be representative of average water conditions throughout the trench. Especially to two regions within each trench need sampling -- the packing material immediately surrounding the discharge tube and the membrane surrounding the packing material. The first location provides optimal conditions for the growth of microorganisms on individual pieces of packing material; growth that coats the gravel here may later slough off and be carried farther out in the packing where it may accumulate and eventually cause fouling. Both the inner and outer faces of the membrane seem to be an ideal location for layers of microorganisms to accumulate and grow, eventually plugging individual pores in the membrane. Other areas of investigation involve (1) examination of the sequence of the microbial development in the trench, either through direct observation or in a model set up on-site and fed with some of the same water being introduced into the trenches, and (2) determination of the most effective means for cleaning the trenches when fouling does occur.

PART V: GROUND-WATER FLOW EVALUATION

Geology and Hydrogeology

83. Description of the geology at the North Boundary area has been presented in detail in previous assessment reports and is not repeated here. The latest cross section (Figure 46) from Lutton (1988) incorporates previously unused geological logs from pilot recharge wells RW-2 through -11 and constitutes an improvement in detail.

Start of Year Alluvial Hydrogeology

84. Hydrogeological conditions in alluvium at the start of FY89 were in continuity with conditions for the past few years. Figure 47 shows the configuration of the water table in October 1988. The map is generated mostly by computer and is distinct in appearance from images in previous years contoured by hand with geological interpretation.*

End of Year Alluvial Hydrogeology

85. Hydrogeological conditions in alluvium at the end of FY89 are shown in Figure 48. Readings on about October 13, 1989 are representative of the end of FY89 despite falling two weeks into FY90.

86. Comparison of the map for the end of the year with that for the start of the year (Figure 47) reveals the rise in water table caused by recharging through the new trenches. The rise is shown separately in

---

* The computer program for contouring entitled MCCON, was developed by the Geotechnical Laboratory, WES. The program is written in FORTRAN and operates on a PC ("286" or "386" IBM compatibles). MCCON is used to prepare contour maps and to prepare section profiles. The program will accept up to 999 data (x,y,z) triplets. MCCON was chosen for this project because it is capable of handling the discontinuous behavior of the water table in the vicinity of the slurry walls. The program generates non-intersecting triangles which connect each and every data (node) point. Triangle generation ceases after all of the nodes are used as a vertex of at least one triangle and the mesh of triangles encompasses all of the nodes in a convex fashion (i.e., the outer edges of the triangle mesh form a convex shape). The resulting mesh will contain no areas that are not included within a triangle (i.e., the mesh will contain no "holes"). Typically, a set of 100 nodes (on a "386" machine with math coprocessor and EGA card) will require 10 seconds to generate the triangle mesh; a set of 400 nodes, 56 seconds; and 900 nodes, 165 seconds. The time devoted to contour line drawing (on the screen) is typically an additional 20-30 seconds. The contour lines are drawn as a series of connecting straight line segments and circular segments. This combination yields an aesthetically pleasing appearance to the resulting contour map.

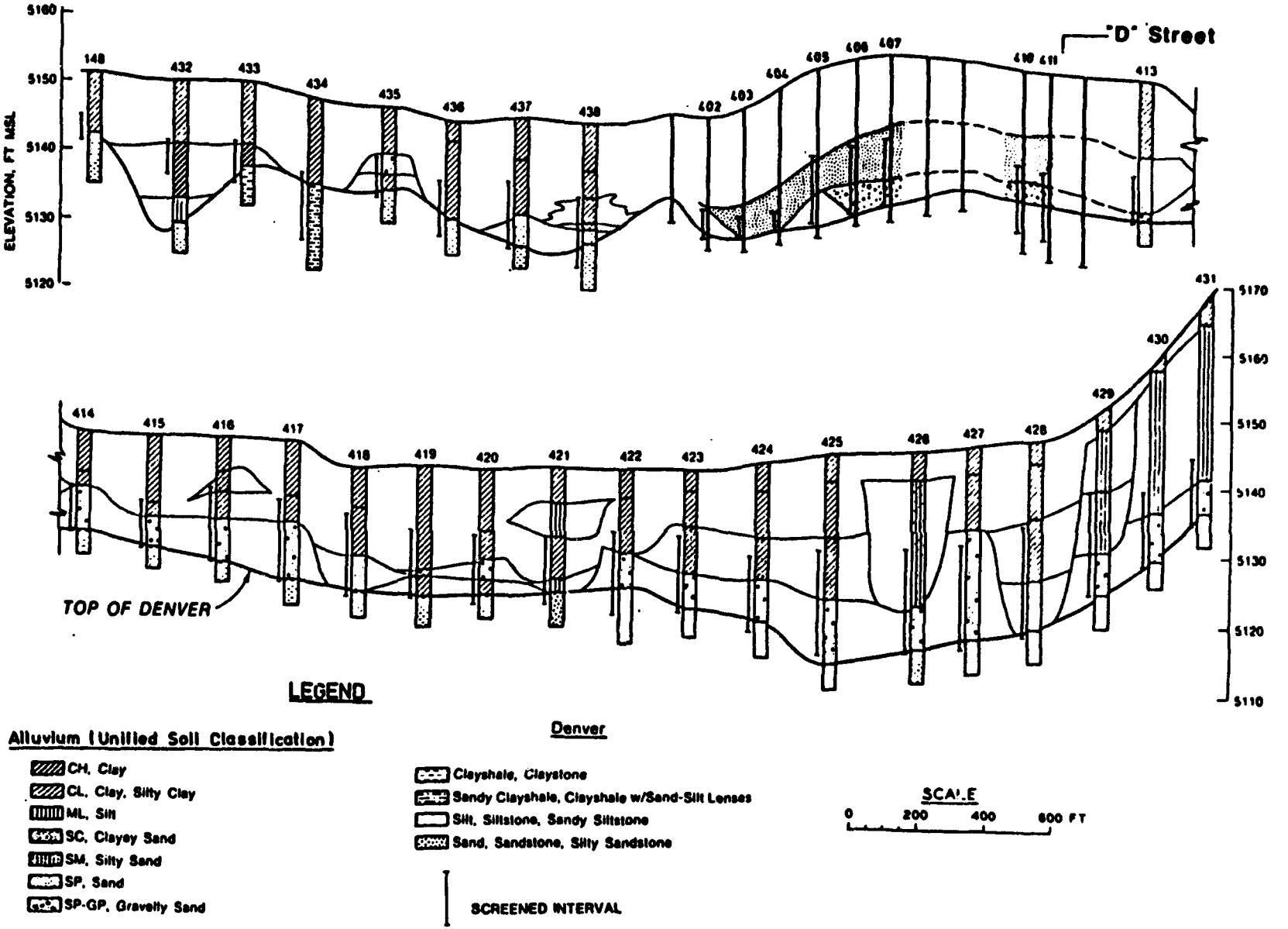


Figure 46. Stratification along line of recharging wells at NBS

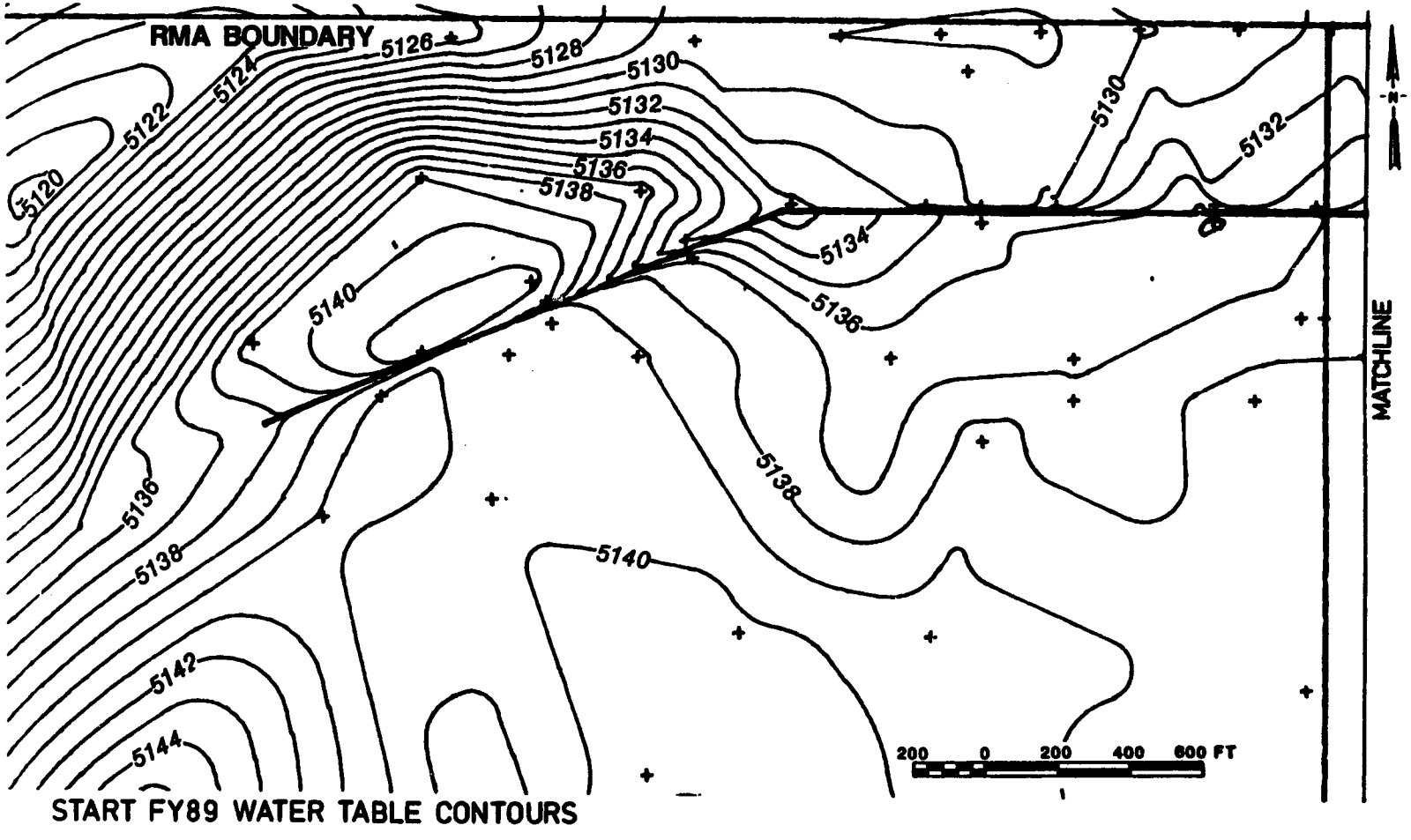


Figure 47. Water-table configuration (ft) at start of FY89

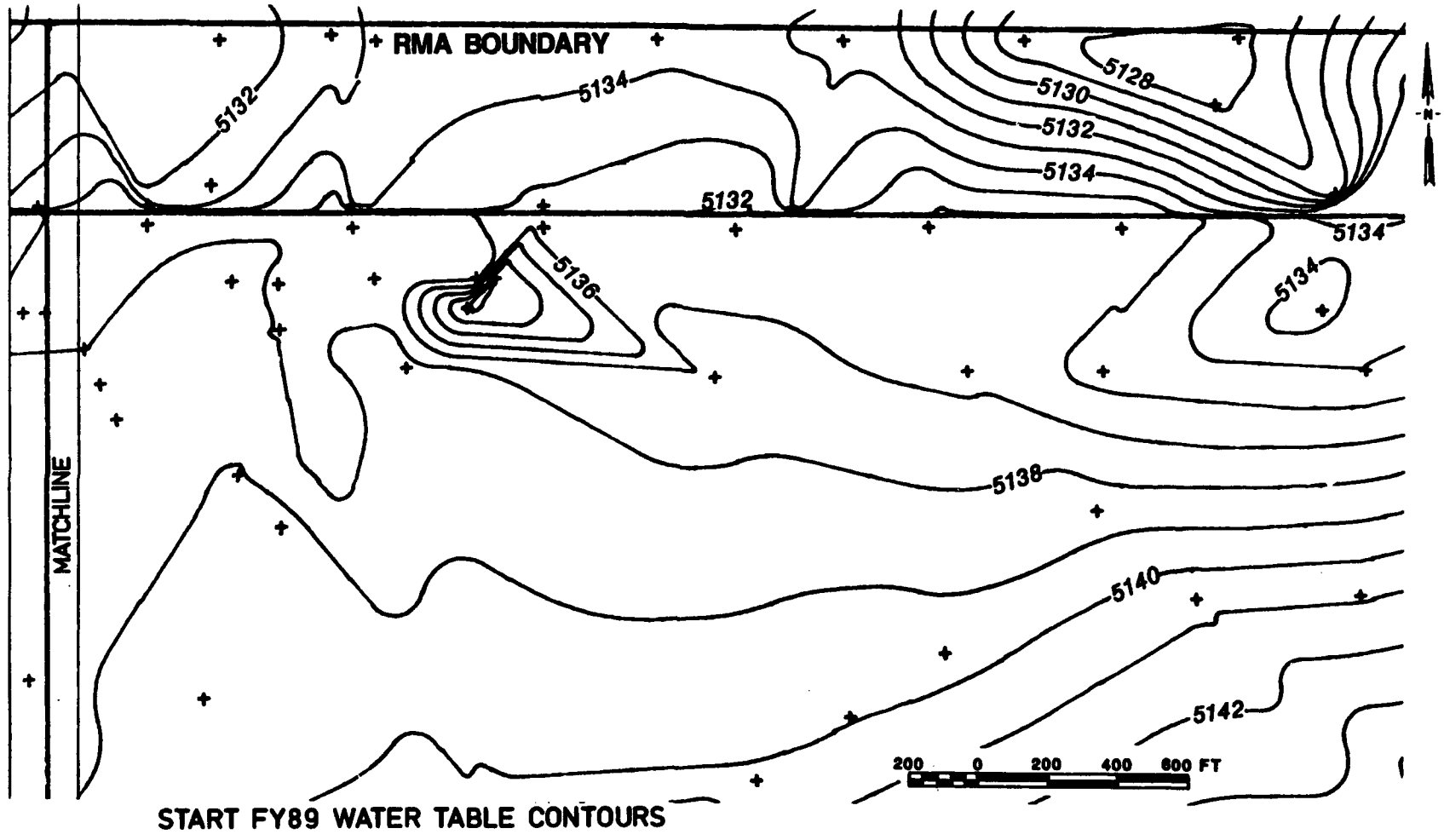


Figure 47. Continued

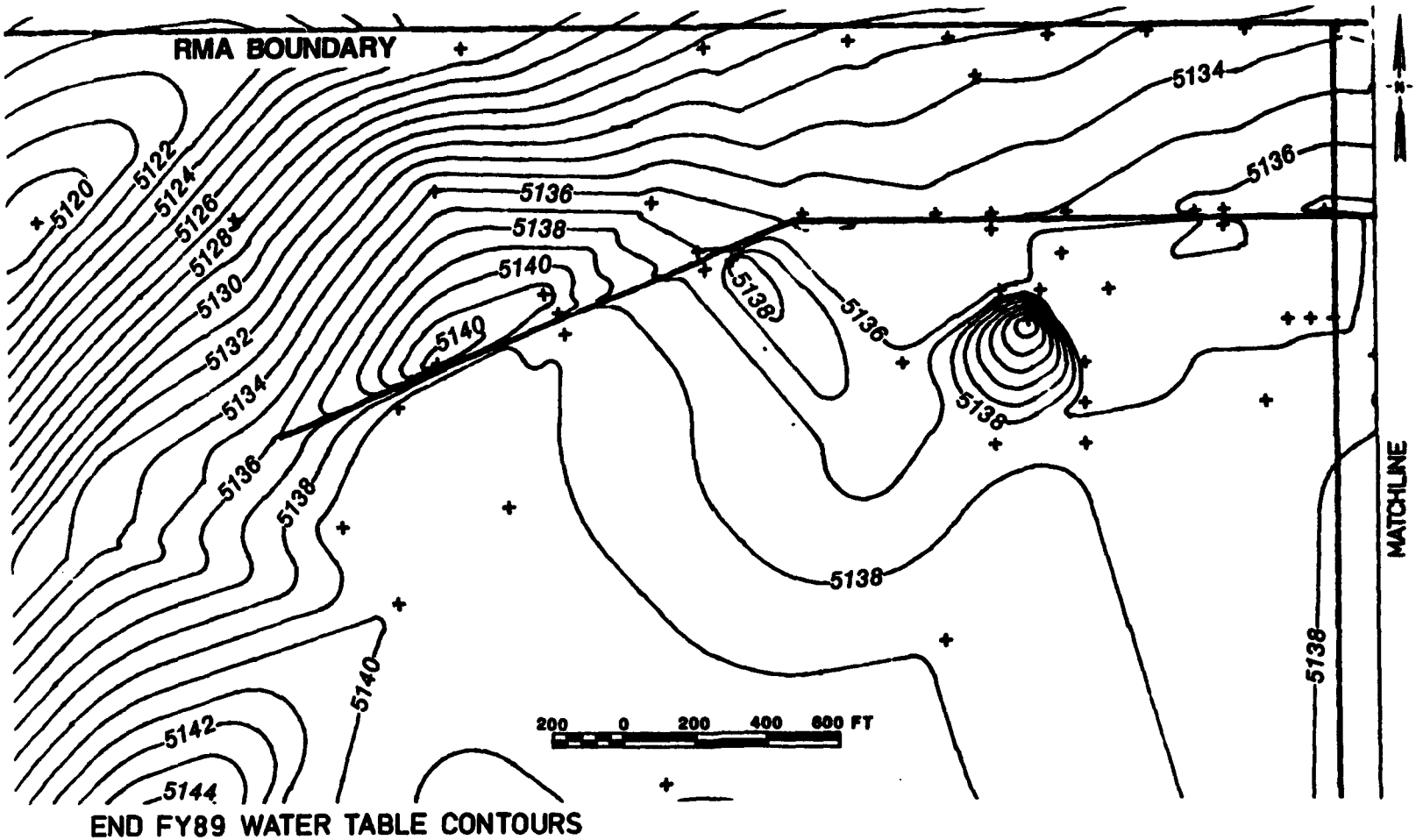


Figure 48. Water-table configuration at end of FY89

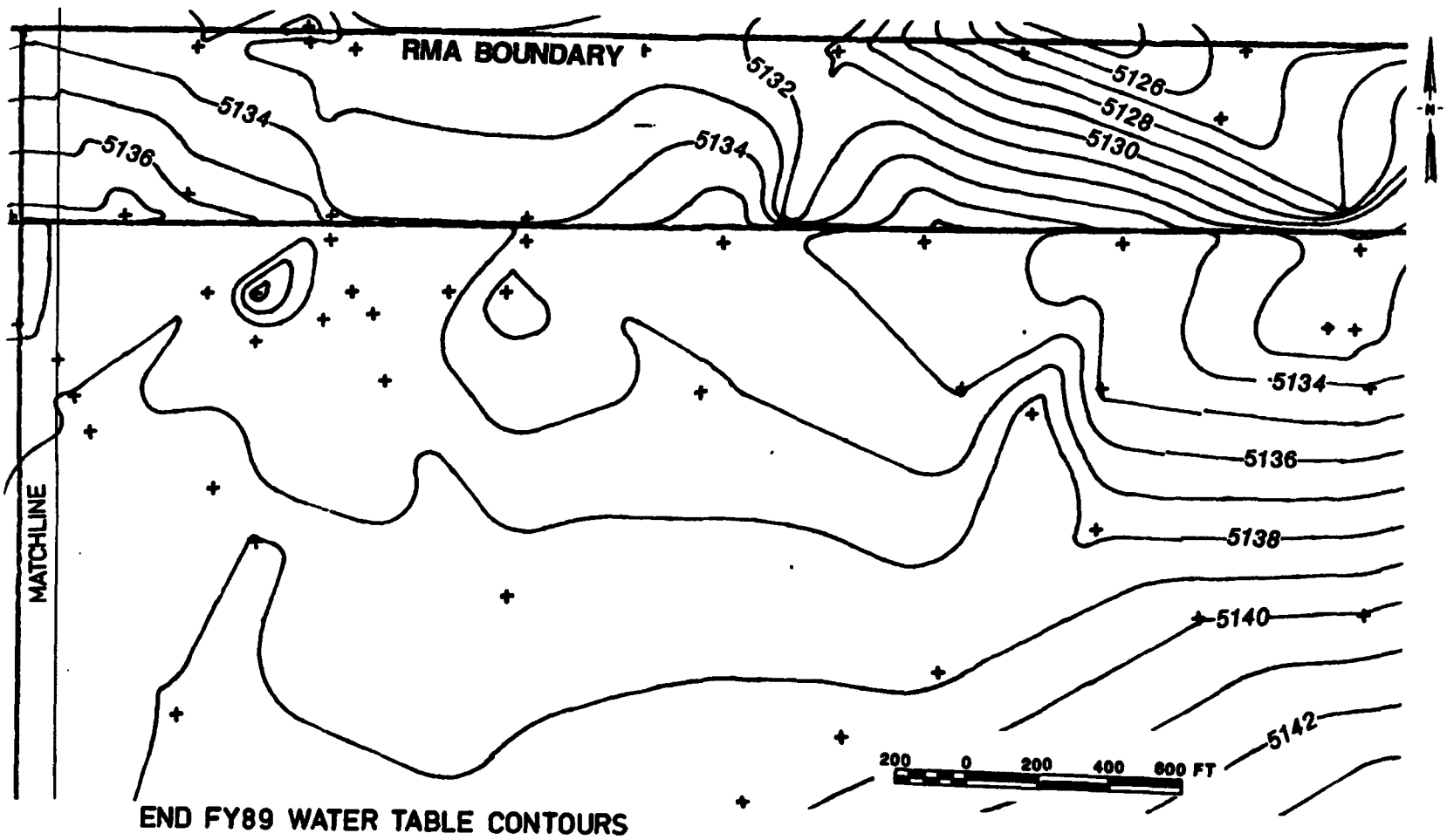


Figure 48. Continued

Figure 49. Figure 49 also shows widespread fall in water table south of the barrier. This fall averaged about 0.5 ft. The conspicuous decline of more than 3.5 ft at the location 800 ft northeast of the west end of the barrier possibly reflects an anomalous condition related to the low-permeability of strata there.

Denver Hydrogeology

87. Only a relatively few monitoring wells are screened in the Denver formation and these are further divided among at least three distinct aquifers. Accordingly no area-wide contouring of piezometric surfaces is meaningful as yet. A general parallelism between configurations in the Denver aquifers and in the alluvial aquifer has been established, but refinement must await the addition of more Denver monitoring wells.

88. A rise of a few feet in piezometric head was detected in individual Denver monitoring wells in the vicinity of the newly recharging trenches early in FY89. The effect was monitored carefully on the possibility that a favorable reversal in gradient might be developing within the Denver. Figure 50 shows piezometric head in the formation beneath the barrier based on data from five monitoring wells screened at about the same depth. The northward gradient remained much as shown throughout the year. Nevertheless, the increase in head around trenches down gradient of the barrier had the effect of decreasing any potential for northward flow in the Denver formation.

Ground-Water Hydrology

Long-Term Trend

89. The general fall in the alluvial water table south of the barrier (paragraph 76) continued the decline of the previous several years (TOD 1989). The decline is not related to droughty conditions since the annual precipitations has recently been above the average 15 in. as follows:

FY	Annual Precipitation (in.)
85	17.82
86	11.54
87	19.05
88	17.55
89	15.27

90. One possible explanation is that the decline results from the NBS pumping and treating more water than naturally flows through the area at

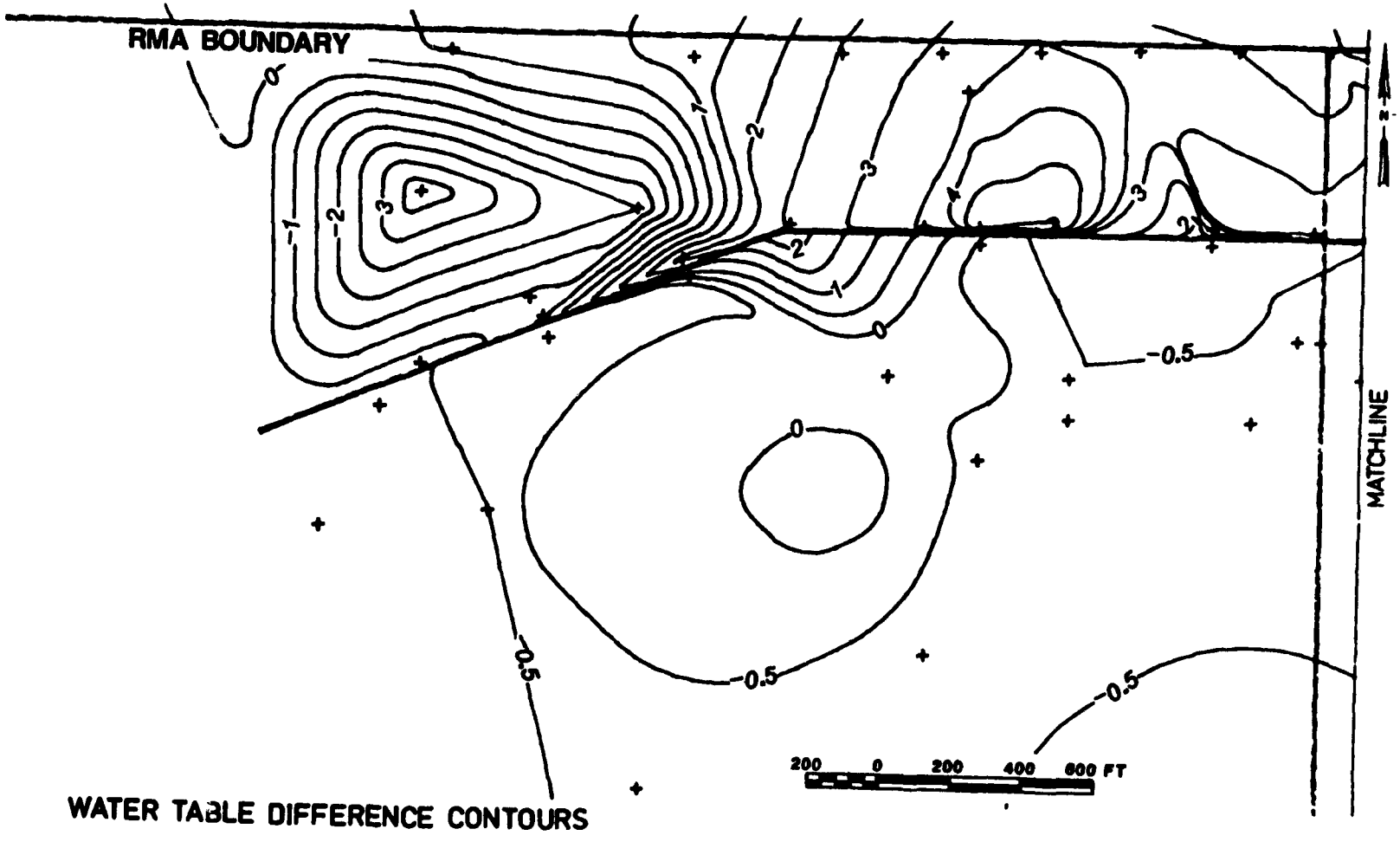


Figure 49. Water-table difference (ft) between start and end of FY89

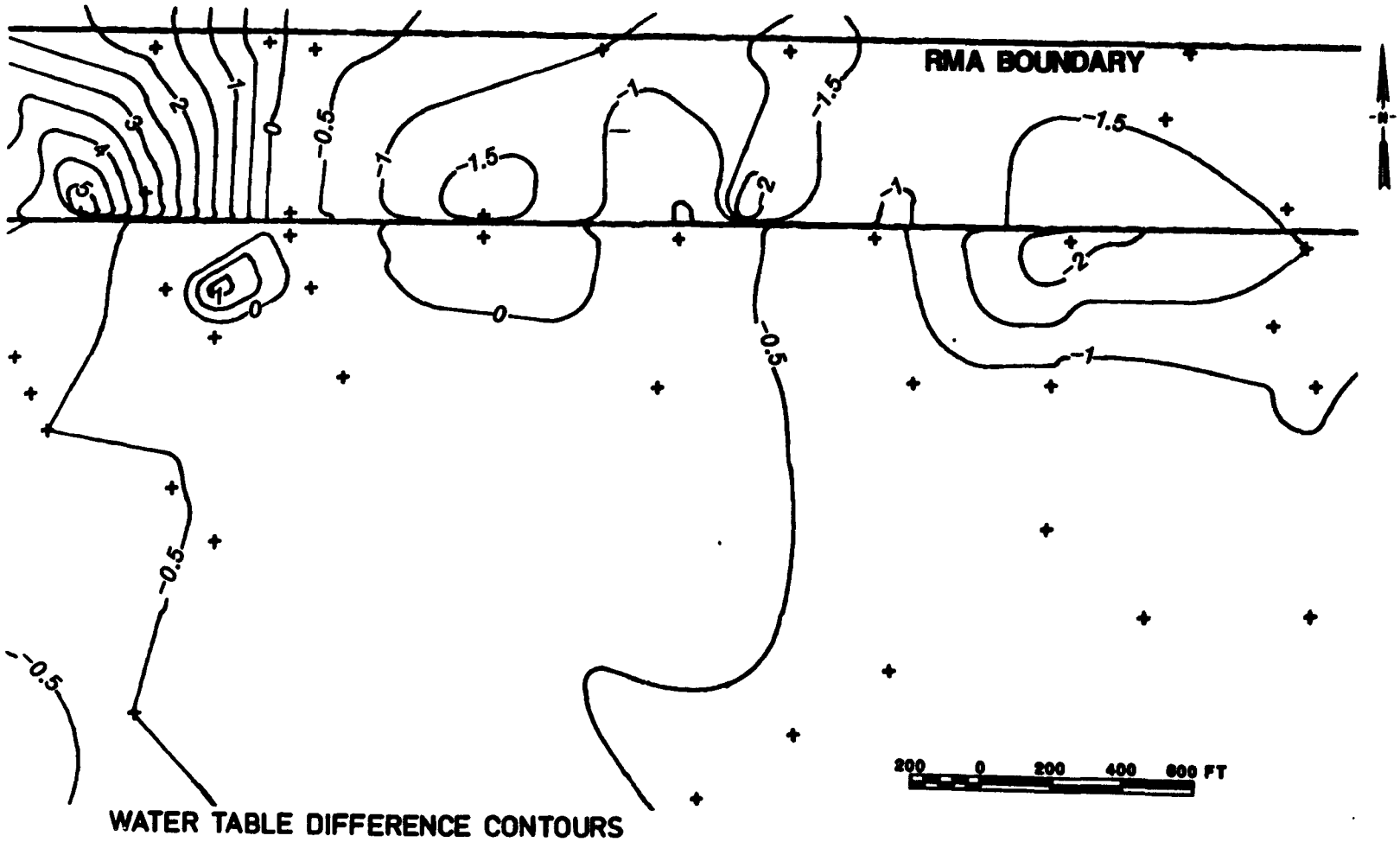


Figure 49. Continued

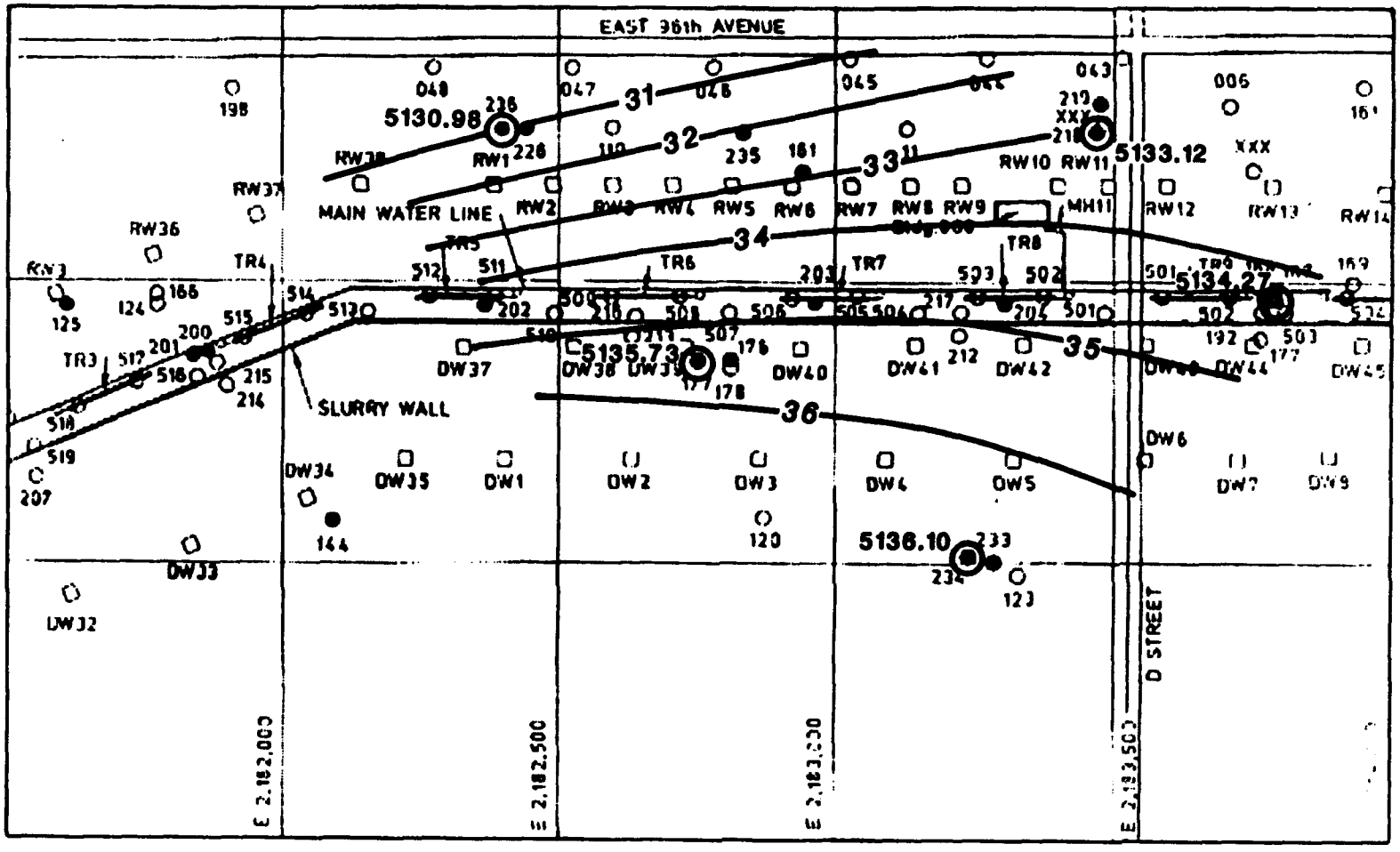


Figure 50. Configuration of piezometric heads in Denver formation in 4th quarter

equilibrium flux. The imbalance has been discussed in previous reports and that discussion is not repeated.

Seasonal trend

91. Seasonal fluctuations are also evident in the behavior of the water table south of the barrier. It has been observed that the levels tend to rise in the first quarter, presumably with the onset of winter.

Recharge Function

92. The NBS is considered to be operating most efficiently when there is a reverse water-table gradient across the barrier, i.e. southward. The addition of recharge trenches has had a favorable effect along half the length of the system but the adverse gradient northward remained east of trenches. Figure 51 shows the progressive effect from October through February by comparison of water levels immediately north and south of the barrier. At the start, essentially all of the barrier was subjected to an unfavorable northward gradient. By March the western half showed a gradient reversal and head difference as great as 6 ft. This head difference was reduced by decreasing recharge on the west in the 3rd and 4th quarter, but the gradient remained favorably southward for the most part (Figures 52 and 53).

93. The unfavorable gradient directed northward along the east half of the NBS remained throughout the year. There was small intensification with the start of trench recharging. Water needed for the trenches was subtracted from that previously recharged on the east in the vicinity of the bog.

94. The performance of recharge trenches will continue to be reflected in their capacity and rate of flow. The interrelationships of water levels, flow rates, and gradients were monitored throughout FY89 for any indications of an onset of trench deterioration. None was found. Late in FY89 trench waters were sampled to determine the presence of bacteria such as might eventually reduce flow through plugging of some pores.

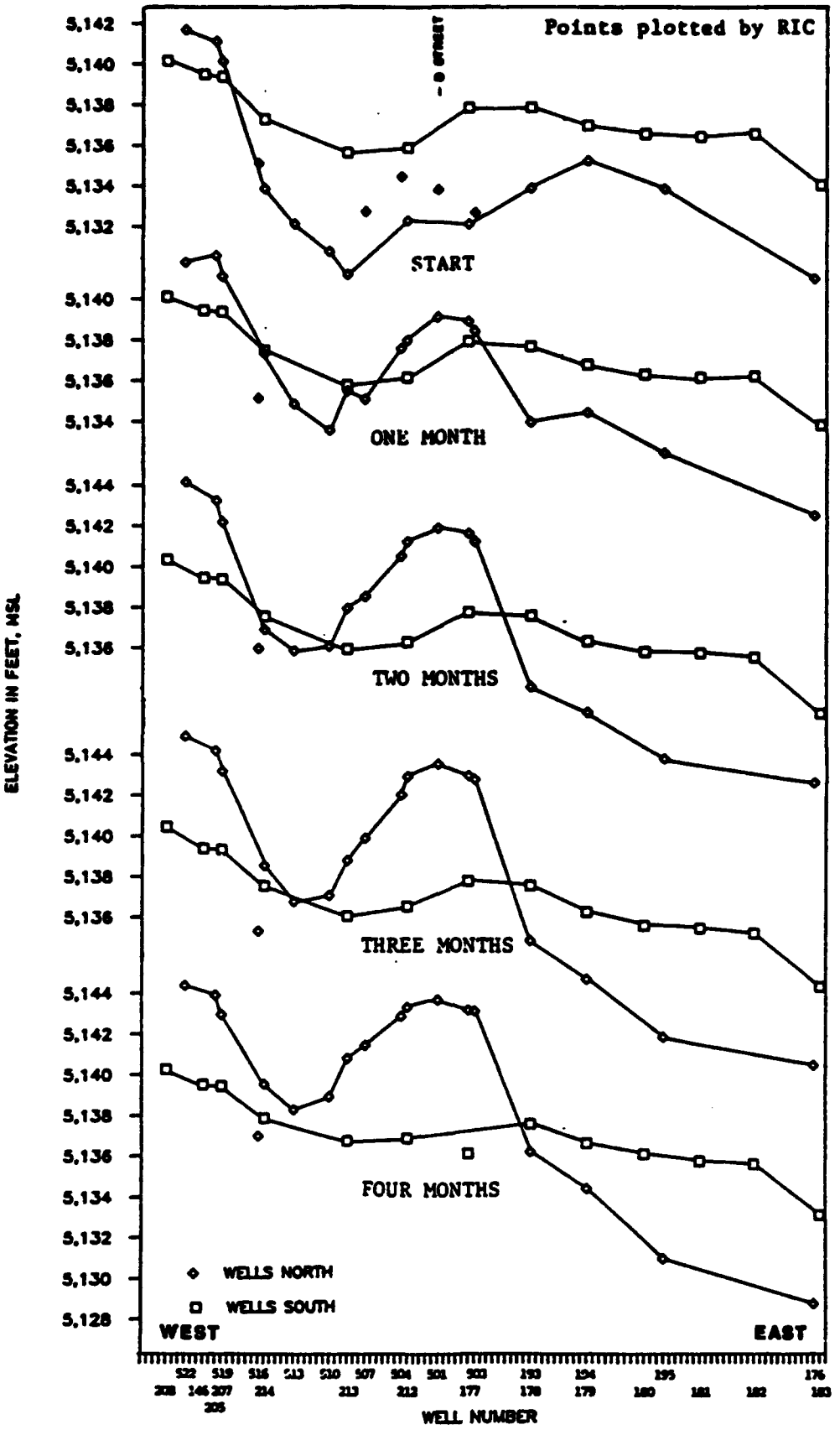


Figure 51. Water-level profiles along barrier for five dates during start-up

SAMPLE DATE: 06/23/89

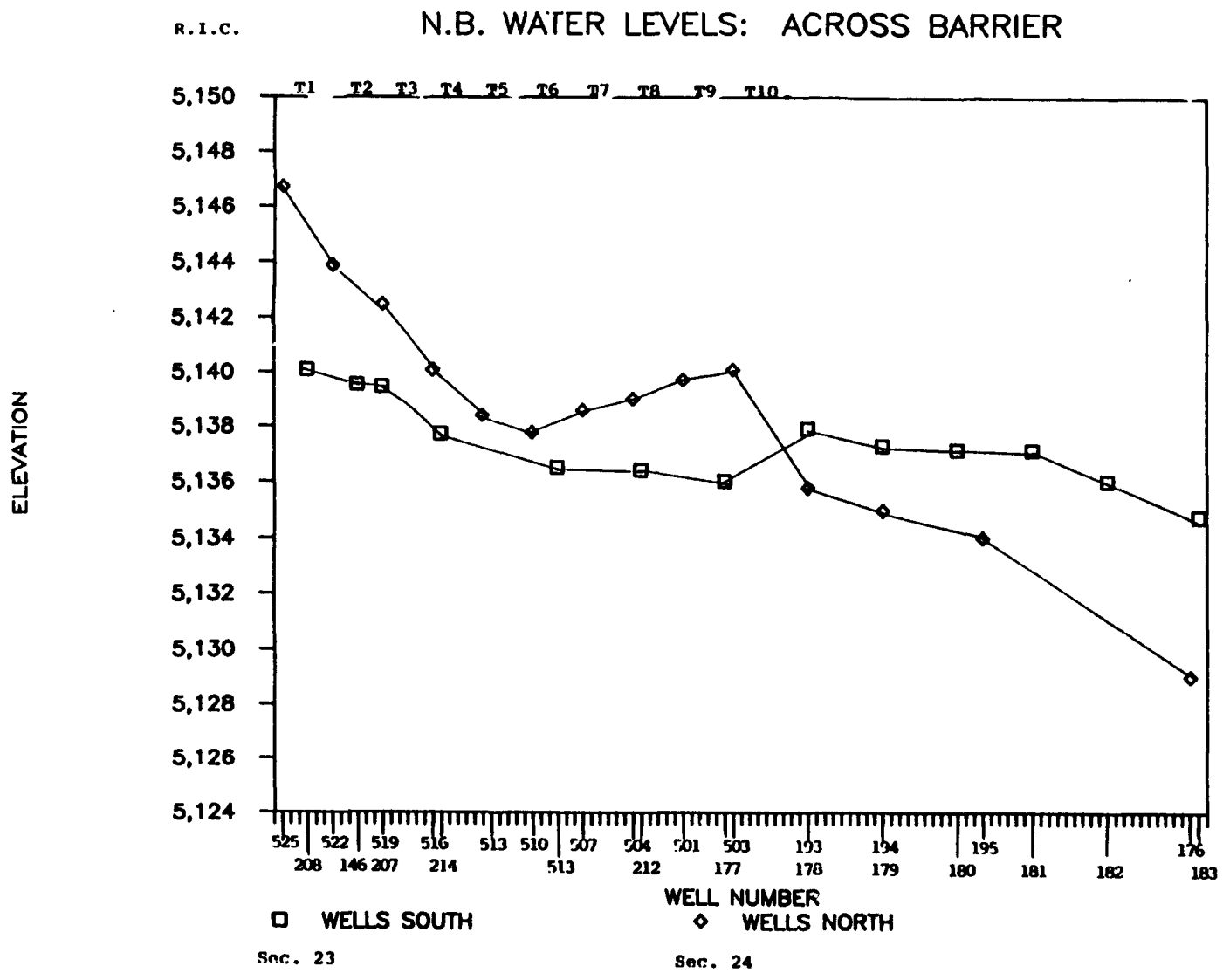


Figure 52. Water-level profiles along barrier for 3rd quarter

SAMPLE DATE: 08/11/89

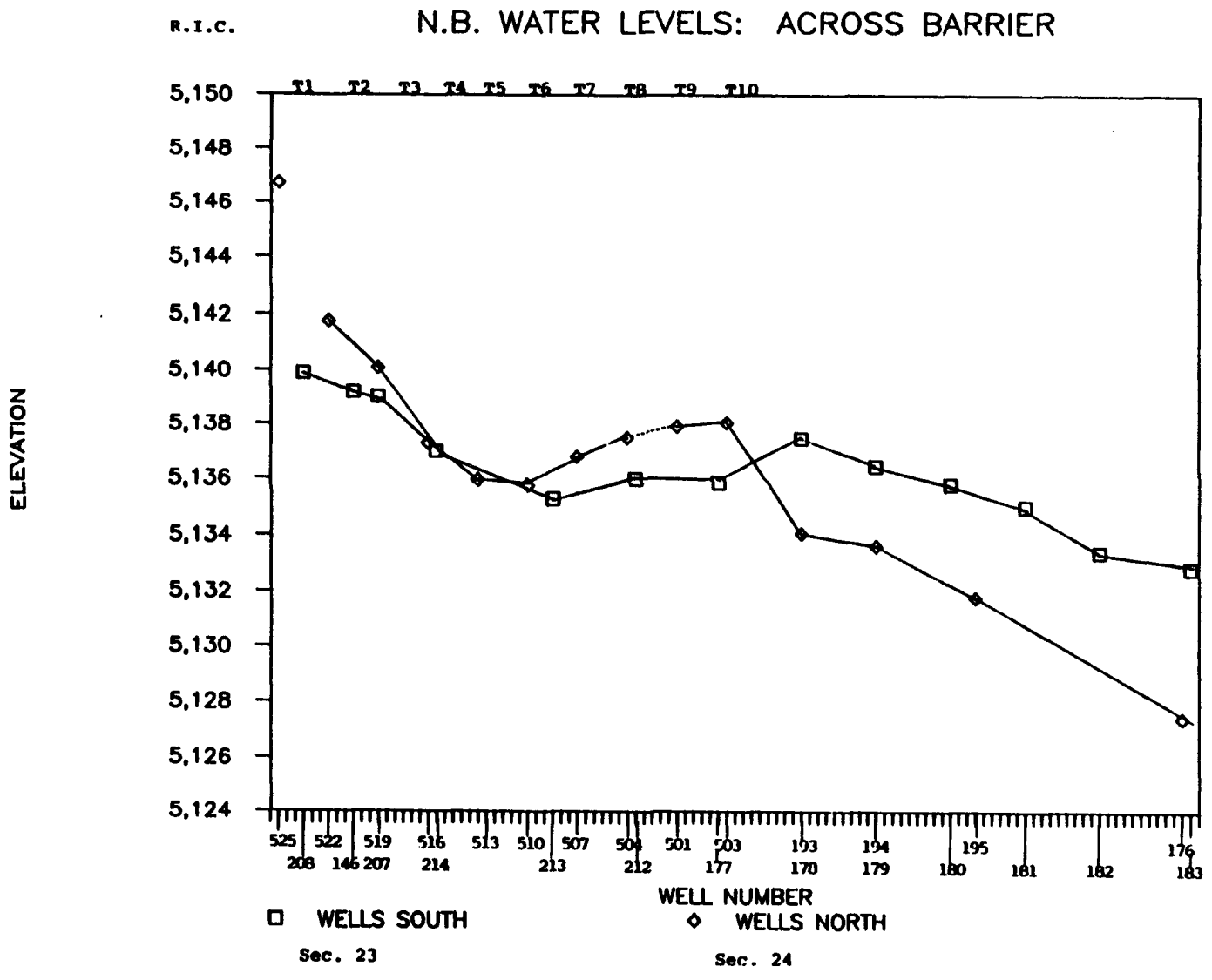


Figure 53. Water-level profiles along barrier for 4th quarter

PART VI: CONCLUSIONS

95. Based on the evaluation of the operations and ground-water data for FY89 at the NBS the following conditions can be made:

a. The 10 gravel-filled recharge trenches installed in the fall 1988 functioned satisfactorily during FY89.

b. Recharge trenches have been proved to be an effective option for recharging.

c. No indications of deterioration of trench system was found in comparisons of apparent k values for dates in the 2nd and 4th quarter.

d. A favorable reversal of head gradient across the barrier was established and maintained along the west half of the system throughout the FY89.

e. Ground-water conditions along the eastern half of the system remained largely unaffected by recharging through trenches.

f. The long-term decline in the water table continued in FY89. This is most clearly visible south of the barrier.

g. Water levels in Denver wells rose as a result of trench recharging. The northward gradient in the Denver formation was not reversed but was reduced so that the potential for flow in the Denver formation decreased.

96. The NBS was very successful in removing organic contaminants from the influent to the system during FY89. Only DIMP was routinely found in the plant effluent at concentrations above its CRL. However, DIMP concentrations in the effluent never exceeded the MOL. Of the other organics, only dieldrin and chloroform were found in one sample each above their respective CRL's. Inorganic contaminants such as chloride and fluoride were not removed by the treatment system. The average chloride and fluoride concentrations in the plant effluent for the year were 258 ppm and 3.2 ppm, respectively.

97. Based upon the data collected for the dewatering wells, the highest concentrations of contaminants were generally found along the western half of the control system in the area of the original NBS. The maximum concentrations of the contaminants were generally found in Well No.'s 34 through 10. The contaminant distribution did not change significantly between FY88 and FY89, however, the data indicates some slight decreases in maximum concentrations for some of the contaminants, particularly DCPD, DIMP, and endrin.

REFERENCES

Thompson, D. W., Environmental Laboratory, USAE Waterways Experiment Station, Berry, E. W., and Anderson, B. L., Technical Operation Directorate, Rocky Mountain Arsenal, and May, J. H., and Hunt, R. W., Geotechnical Laboratory, USAE Waterways Experiment Station, December 1985. "North Boundary Containment/Treatment System Performance Report, Volume I," Rocky Mountain Arsenal Information Center Reference Library Number 86078R01, Rocky Mountain Arsenal, Commerce City, Colorado.

Rocky Mountain Arsenal Contamination Control Program Team, Installation Restoration at Rocky Mountain Arsenal, "Selection of a Contamination Control Strategy for RMA," Volume II, Appendix D, page D-9, Report No. DRXTH-SE-83206, September 1983, U.S. Army Toxic and Hazardous Materials Agency and Rocky Mountain Arsenal. Rocky Mountain Arsenal Information Center Reference Library Number 83326R01, Rocky Mountain Arsenal, Commerce City, Colorado.

Program Manager Staff Office (PMSO) Program Manager, Rocky Mountain Arsenal Contamination Cleanup, Aberdeen Proving Ground Maryland. June 1987. "Rocky Mountain Arsenal North Boundary Containment/Treatment System Operational Assessment Report FY85/FY86." Rocky Mountain Arsenal Information Center Reference Library Number 87320R01, Rocky Mountain Arsenal, Commerce City, Colorado.

PMRMA 1988. "Rocky Mountain Arsenal North Boundary Containment/Treatment System Operational Assessment Report, FY87, Final Report," Rocky Mountain Arsenal Information Center Reference Library Number 89263R01 Rocky Mountain Arsenal, Commerce City, Colorado.

Stollar and Associates. 1989. "Comprehensive Monitoring Program: Annual Ground Water Report for 1988 Final Report," Rocky Mountain Arsenal Information Center, Library Number 89213R01, Rocky Mountain Arsenal, Commerce City, Colorado.

Lutton, R. J., Geotechnical Laboratory, USAE Waterways Experiment Station, December 1988. "Conceptual Design Interim Ground-Water Recharge System, RMA North Boundary Area," Miscellaneous Paper GL-88-35. USAE Waterways Experiment Station, Vicksburg, Mississippi.

Lutton, R. J., Geotechnical Laboratory, USAE Waterways Experiment Station, August 1989. "Start-up Performance of Ground-Water Recharge Trenches Rocky Mountain Arsenal," Technical Report GL-89-11, USAE Waterways Experiment Station, Vicksburg, Mississippi.

PMRMA, Technical Operations Division, December 1989. "North Boundary Containment/Treatment System Operational Assessment Report FY88." Rocky Mountain Arsenal Information Center Reference Library Number 90061R01 Rocky Mountain Arsenal Commerce City, Colorado.

APPENDIX A

FLOW DATA

D.P.A.

NORTH BOUNDARY TREATMENT PLANT
FY 89 WEEKLY FLOWS FOR ADSORBERS

DATE	A GAL(000)	A GPM	B GAL(000)	B GPM	C GAL(000)	C GPM	TOTAL GAL(000)	TOTAL GPM
10/07/88	3,222	31.94	8,726	86.51	6,322	62.67	18,270	181.12
10/14/88	5,032	49.85	8,133	80.56	11,465	113.57	24,630	243.98
10/21/88	5,059	50.16	7,778	77.12	11,015	109.22	23,852	236.50
10/28/88	4,786	47.62	7,531	74.94	9,332	92.86	21,649	215.42
11/04/88	5,304	52.31	6,959	68.63	9,794	96.59	22,057	217.53
11/11/88	5,366	53.08	8,122	80.34	11,363	112.39	24,851	245.81
11/18/88	5,604	55.68	8,850	87.93	11,347	112.74	25,801	256.35
11/25/88	5,722	56.79	9,880	98.06	12,468	123.75	28,070	278.60
12/02/88	5,765	57.14	10,094	100.04	13,286	131.67	29,145	288.85
12/09/88	6,257	62.04	10,777	106.86	14,452	143.30	31,486	312.20
12/16/88	6,302	62.57	10,368	102.94	13,516	134.19	30,186	299.70
12/23/88	5,049	50.10	9,826	97.50	12,330	122.35	27,205	269.95
12/30/88	5,686	56.38	10,509	104.20	13,011	129.01	29,206	289.59
01/06/89	5,453	54.10	10,069	99.89	12,674	125.73	28,196	279.72
01/13/89	5,839	57.93	10,001	99.22	14,743	146.26	30,583	303.41
01/20/89	5,257	52.20	10,633	105.59	14,126	140.28	30,016	298.07
01/27/89	5,154	50.95	10,056	99.42	14,642	144.76	29,852	295.13
02/03/89	4,983	49.51	10,022	99.57	14,515	144.21	29,520	293.29
02/10/89	5,231	52.13	9,667	96.33	14,407	143.57	29,305	292.03
02/17/89	5,095	50.32	9,892	97.70	13,860	136.89	28,847	284.91
02/24/89	4,729	47.08	9,969	99.24	14,331	142.67	29,029	288.99
03/03/89	4,678	46.39	9,545	94.65	14,324	142.03	28,547	283.07
03/10/89	4,662	46.25	9,487	94.12	13,805	136.95	27,954	277.32
03/17/89	4,811	47.75	9,712	96.40	13,682	135.80	28,205	279.95
03/24/89	3,905	38.74	8,665	85.96	13,235	131.30	25,805	256.00
03/31/89	3,947	39.14	8,401	83.30	14,673	145.49	27,021	267.93
04/07/89	3,766	37.40	7,681	76.28	13,682	135.87	25,129	249.55
04/14/89	3,696	36.83	6,964	69.40	12,659	126.15	23,319	232.38
04/21/89	3,995	39.59	7,002	69.40	13,229	131.11	24,226	240.10
04/28/89	4,311	42.79	6,744	66.94	13,273	131.74	24,328	241.47
05/05/89	4,098	40.63	6,584	65.29	12,302	121.98	22,984	227.90
05/12/89	4,633	46.03	6,702	66.59	11,932	118.55	23,267	231.17
05/19/89	4,140	41.03	5,696	56.45	11,194	110.94	21,030	208.42
05/26/89	4,740	46.98	8,057	79.85	11,882	117.76	24,679	244.59
06/02/89	4,983	49.48	7,945	78.90	12,357	122.71	25,285	251.09
06/09/89	4,730	46.92	6,636	65.83	11,368	112.78	22,734	225.53
06/16/89	5,614	55.61	5,098	50.50	12,650	125.31	23,362	231.42
06/23/89	5,152	51.19	7,111	70.65	12,262	121.83	24,525	243.67
06/30/89	3,885	38.52	6,936	68.78	12,570	124.64	23,391	231.94
07/07/89	4,510	44.74	6,552	65.00	11,668	115.75	22,730	225.49
07/14/89	5,491	53.78	7,456	73.03	12,393	121.38	25,340	248.19
07/21/89	4,959	49.86	6,742	67.79	10,880	109.40	22,581	227.05
07/28/89	5,077	50.22	7,461	73.80	12,544	124.08	25,082	248.10
08/04/89	5,303	52.74	7,139	71.00	12,955	128.84	25,397	252.58

D.P.A.

NORTH BOUNDARY TREATMENT PLANT
FY 89 WEEKLY FLOWS FOR ADSORBERS

DATE	A		B		C		TOTAL	
	GAL(000)	GPM	GAL(000)	GPM	GAL(000)	GPM	GAL(000)	GPM
08/11/89	4,879	48.38	7,523	74.60	11,993	118.92	24,395	241.90
08/18/89	5,387	53.50	7,849	77.94	12,076	119.92	25,312	251.36
08/25/89	5,556	55.01	8,002	79.23	12,669	125.44	26,227	259.68
09/01/89	5,588	55.49	7,889	78.34	11,745	116.63	25,222	250.46
09/08/89	4,726	46.84	6,786	67.25	11,452	113.50	22,964	227.59
09/15/89	4,759	47.31	6,893	68.52	10,363	103.01	22,015	218.84
09/22/89	4,325	42.93	7,624	75.67	11,603	115.17	23,552	233.77
09/30/89	5,528	47.99	9,505	82.51	14,702	127.62	29,735	258.12

D.P.A.

NORTH BOUNDARY TREATMENT PLANT
FY 89 QUARTERLY FLOWS FOR ADSORBERS

	A		B		C		TOTAL	
DATE	GAL(000)	GPM	GAL(000)	GPM	GAL(000)	GPM	GAL(000)	GPM
1st QTR	69,154	52.74	117,553	89.66	149,701	114.18	336,408	256.58
2nd QTR	63,744	48.65	126,119	96.26	183,017	139.69	372,880	284.60
3rd QTR	57,743	44.08	89,156	68.07	161,360	123.18	308,259	235.33
4th QTR	66,088	49.91	97,421	73.44	157,043	118.44	320,552	241.78
ANNUAL	256,729	48.85	430,249	81.86	651,121	123.87	1,338,099	254.57

APPENDIX B

TREATMENT PLANT WATER QUALITY DATA STATISTICAL SUMMARY

AND GC/MS ANALYSIS

NORTH BOUNDARY TREATMENT PLANT - ADSORBER A FOR FY 89

SAMPLE DATE	111TCE ug/l	112TCE ug/l	11DCE ug/l	11DCLE ug/l	12DCE ug/l	12DCLE ug/l	13DNB ug/l	ALDRN ug/l
10/06/88	....	....	....	....	....	....	....	LT 0.050
10/13/88	....	....	....	....	....	....	....	LT 0.050
10/20/88	....	....	....	....	....	....	....	....
10/27/88	....	....	....	....	....	....	....	3.700
11/03/88	....	....	....	....	....	....	....	5.400
11/10/88	....	....	....	....	....	....	....	....
11/17/88	....	....	....	....	....	....	....	....
11/24/88	....	....	....	....	....	....	....	....
12/01/88	....	....	....	....	....	....	....	0.345
12/08/88	....	....	....	....	....	....	....	0.416
12/15/88	....	....	....	....	....	....	....	LT 0.250
12/22/88	....	....	....	....	....	....	....	0.096
12/29/88	....	....	....	....	....	....	....	....
01/04/89	....	....	....	....	....	....	....	LT 0.050
01/11/89	....	....	....	....	....	....	....	0.096
01/18/89	LT 0.760	LT 0.780	LT 1.700	LT 0.730	LT 0.760	4.600	LT 1.320	0.060
01/25/89	....	....	....	....	....	....	....	0.603
02/01/89	....	....	....	....	....	....	....	0.097
02/08/89	....	....	....	....	....	....	....	LT 0.050
02/15/89	....	....	....	....	....	....	....	LT 0.050
02/22/89	....	....	....	....	....	....	....	....
03/01/89	....	....	....	....	....	....	....	LT 0.050
03/08/89	....	....	....	....	....	....	....	LT 0.050
03/15/89	....	....	....	....	....	....	....	LT 0.050
03/22/89	....	....	....	....	....	....	....	LT 0.050
03/29/89	....	....	....	....	....	....	....	....
04/05/89	....	....	....	....	....	....	....	LT 0.050
04/12/89	....	....	....	....	....	....	....	0.553
04/19/89	....	....	....	....	....	....	....	0.071
04/26/89	....	....	....	....	....	....	....	0.129
05/03/89	....	....	....	....	....	....	....	0.203
05/10/89	....	....	....	....	....	....	....	0.252
05/17/89	....	....	....	....	....	....	....	....
05/24/89	....	....	....	....	....	....	....	....
05/31/89	....	....	....	....	....	....	....	....
06/07/89	....	....	....	....	....	....	....	....
06/14/89	....	....	....	....	....	....	....	0.952
06/21/89	LT 0.760	LT 0.780	LT 1.700	LT 0.730	LT 0.760	4.710	LT 1.320	LT 0.050
06/28/89	....	....	....	....	....	....	....	LT 0.050
07/05/89	....	....	....	....	....	....	....	....
07/12/89	....	....	....	....	....	....	....	LT 0.050
07/19/89	....	....	....	....	....	....	....	0.231
07/26/89	....	....	....	....	....	....	....	LT 0.050
08/02/89	....	....	....	....	....	....	....	0.213
08/09/89	....	....	....	....	....	....	....	....
08/16/89	....	....	....	....	....	....	....	0.364
08/23/89	....	....	....	....	....	....	....	0.447
08/30/89	....	....	....	....	....	....	....	0.590
09/06/89	....	....	....	....	....	....	....	LT 0.050
09/13/89	....	....	....	....	....	....	....	0.123
09/20/89	....	....	....	....	....	....	....	0.130
09/27/89	....	....	....	....	....	....	....	0.196

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED
ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - ADSORBER A FOR FY 89

SAMPLE DATE	ATZ ug/l	BCHPO ug/l	BTZ ug/l	C6H6 ug/l	CCL4 ug/l	CH2CL2 ug/l	CHCL3 ug/l	CHLORIDE mg/l	CL6CP ug/l
10/06/88	....	....	....	....	....	....	....	920	....
10/13/88	....	....	....	....	....	....	....	....	....
10/20/88	....	....	....	....	....	....	....	910	....
10/27/88	....	....	....	....	....	....	....	910	....
11/03/88	....	....	....	....	....	....	....	740	....
11/10/88	....	....	....	....	....	....	....	950	....
11/17/88	....	....	....	....	....	....	....	910	....
11/24/88	....	....	....	....	....	....	....	....	....
12/01/88	....	....	....	....	....	....	....	890	....
12/08/88	....	....	....	....	....	....	....	910	....
12/15/88	....	....	....	....	....	....	....	740	....
12/22/88	....	....	....	....	....	....	....	870	....
12/29/88	....	....	....	....	....	....	....	....	....
01/04/89	....	....	....	....	....	....	....	860	....
01/11/89	....	....	....	....	....	....	....	830	....
01/18/89	38.900	....	LT 5.000	LT 1.050	LT 0.990	LT 7.400	3.910	845	LT 0.048
01/25/89	....	....	....	....	....	....	....	700	....
02/01/89	....	....	....	....	....	....	....	760	....
02/08/89	....	....	....	....	....	....	....	800	....
02/15/89	....	....	....	....	....	....	....	830	....
02/22/89	....	....	....	....	....	....	....	810	....
03/01/89	....	....	....	....	....	....	....	780	....
03/08/89	....	....	....	....	....	....	....	930	....
03/15/89	....	....	....	....	....	....	....	800	....
03/22/89	....	....	....	....	....	....	....	740	....
03/29/89	....	....	....	....	....	....	....	780	....
04/05/89	....	....	....	....	....	....	....	790	....
04/12/89	....	....	....	....	....	....	....	700	....
04/19/89	....	....	....	....	....	....	....	770	....
04/26/89	....	....	....	....	....	....	....	760	....
05/03/89	....	....	....	....	....	....	....	830	....
05/10/89	....	....	....	....	....	....	....	870	....
05/17/89	....	....	....	....	....	....	....	820	....
05/24/89	....	....	....	....	....	....	....	830	....
05/31/89	....	....	....	....	....	....	....	820	....
06/07/89	....	....	....	....	....	....	....	740	....
06/14/89	....	....	....	....	....	....	....	750	....
06/21/89	....	LT 5.900	LT 5.000	LT 1.050	LT 0.990	LT 7.400	2.300	965	1.300
06/28/89	....	....	....	....	....	....	....	920	....
07/05/89	....	....	....	....	....	....	....	970	....
07/12/89	....	....	....	....	....	....	....	890	....
07/19/89	....	....	....	....	....	....	....	890	....
07/26/89	....	....	....	....	....	....	....	1,000	....
08/02/89	....	....	....	....	....	....	....	980	....
08/09/89	....	....	....	....	....	....	....	810	....
08/16/89	....	....	....	....	....	....	....	880	....
08/23/89	....	....	....	....	....	....	....	....	....
08/30/89	....	....	....	....	....	....	....	1,000	....
09/06/89	....	....	....	....	....	....	....	820	....
09/13/89	....	....	....	....	....	....	....	940	....
09/20/89	....	....	....	....	....	....	....	950	....
09/27/89	....	....	....	....	....	....	....	840	....

LT = LESS THAN The Following Concentration
ug/l = MICROGRAM PER LITER
.... INDICATES THAT ANALYSIS WAS NOT PERFORMED
mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - ADSORBER A FOR FY 89

SAMPLE DATE	CLC6H5 ug/l	CLDAN ug/l	CPMS ug/l	CPMSO ug/l	CPMSO2 ug/l	DBCP ug/l	DCPD ug/l	DDVP ug/l	DIMP ug/l
10/06/88	....	....	LT 5.690	20.800	LT 7.460	0.555	....	....	760
10/13/88	....	....	LT 5.690	25.300	28.600	0.513	....	....	790
10/20/88	....	....	LT 5.690	26.700	29.100	....	440	....	....
10/27/88	....	....	LT 5.690	30.500	27.500	0.768	390	....	870
11/03/88	....	....	LT 5.690	21.400	LT 7.460	1.280	290	....	850
11/10/88	....	....	LT 5.690	37.300	43.300	LT 0.195	310	....	930
11/17/88	....	....	LT 5.690	37.800	36.200	0.893	400	....	950
11/24/88	....	....	....	....	....	....	....	....	....
12/01/88	....	....	LT 5.690	19.000	37.800	0.821	420	....	840
12/08/88	....	....	LT 5.690	30.900	40.500	0.861	410	....	820
12/15/88	....	....	LT 5.690	28.600	27.200	1.050	260	....	780
12/22/88	....	....	LT 5.690	34.300	41.700	1.000	450	....	920
12/29/88	....	....	....	....	....	....	....	....	....
01/04/89	....	....	LT 5.690	30.700	44.300	0.943	320	....	990
01/11/89	....	....	6.520	37.000	43.100	0.865	410	....	650
01/18/89	LT 0.820	LT 0.095	7.345	44.950	46.050	0.824	500	LT 0.384	880
01/25/89	....	....	8.170	50.600	38.500	1.020	250	....	770
02/01/89	....	....	LT 5.690	39.100	43.300	0.885	400	....	850
02/08/89	....	....	LT 5.690	39.500	45.400	0.864	470	....	870
02/15/89	....	....	7.200	42.700	43.800	0.846	360	....	870
02/22/89	....	....	LT 5.690	38.400	34.400	0.846	360	....	900
03/01/89	....	....	....	....	....	....	310	....	860
03/08/89	....	....	LT 5.690	31.900	31.100	0.818	380	....	660
03/15/89	....	....	LT 5.690	47.200	27.700	0.666	320	....	980
03/22/89	....	....	LT 5.690	27.700	23.700	LT 0.195	....	....	750
03/29/89	....	....	LT 5.690	27.700	29.400	0.272	330	....	760
04/05/89	....	....	LT 5.690	30.900	31.900	0.730	340	....	670
04/12/89	....	....	LT 5.690	33.500	26.200	0.939	270	....	720
04/19/89	....	....	LT 5.690	36.400	33.300	0.837	300	....	630
04/26/89	....	....	LT 5.690	48.300	LT 7.460	LT 0.195	310	....	850
05/03/89	....	....	LT 5.690	41.700	40.000	0.699	350	....	720
05/10/89	....	....	LT 5.690	42.100	34.600	0.682	290	....	....
05/17/89	....	....	LT 5.690	47.200	41.200	0.836	300	....	730
05/24/89	....	....	LT 5.690	41.000	42.700	0.728	370	....	990
05/31/89	....	....	LT 5.690	46.900	41.800	0.639	400	....	920
06/07/89	....	....	LT 5.690	48.500	38.800	0.927	330	....	830
06/14/89	....	....	LT 5.690	40.800	32.000	LT 0.195	340	....	790
06/21/89	LT 0.820	....	LT 5.690	54.250	47.450	0.504	335	....	825
06/28/89	....	....	LT 5.690	LT 11.500	56.400	0.520	340	....	1,100
07/05/89	....	....	6.260	58.800	74.100	0.702	330	....	870
07/12/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	LT 0.650
07/19/89	....	....	LT 5.690	37.300	50.200	0.707	320	....	830
07/26/89	....	....	6.380	50.100	....	0.499	360	....	910
08/02/89	....	....	LT 5.690	44.300	63.100	0.534	310	....	640
08/09/89	....	....	LT 5.690	46.800	38.800	0.402	250	....	720
08/16/89	....	....	LT 5.690	37.400	42.200	0.527	320	....	750
08/23/89	....	....	LT 5.690	38.900	52.800	0.549	340	....	650
08/30/89	....	....	LT 5.690	27.000	33.600	0.476	270	....	930
09/06/89	....	....	6.490	60.100	31.600	1.310	200	....	850
09/13/89	....	....	LT 5.690	54.900	42.100	0.840	300	....	....
09/20/89	....	....	LT 5.690	37.400	28.200	0.684	....	....	740
09/27/89	....	....	LT 5.690	18.800	26.500	0.419	280	....	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED
ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - ADSORBER A FOR FY 89

SAMPLE DATE	DITH ug/l	OLDRN ug/l	DMDS ug/l	ENDRN ug/l	ETC6H5 ug/l	FLUORIDE mg/l	ISODR ug/l	MEC6H5 ug/l	MLTHN ug/l
10/06/88	21.700	0.334	....	0.338	....	6.720	LT 0.051	....	....
10/13/88	23.100	0.293	....	0.147	....	....	0.147	....	....
10/20/88	20.800	....	....	....	....	5.610	....	....	....
10/27/88	19.800	2.000	....	2.500	....	6.440	....	....	....
11/03/88	LT 1.340	2.700	....	2.100	....	5.650	....	....	....
11/10/88	25.300	2.800	....	2.500	....	6.410	....	....	....
11/17/88	20.400	2.300	....	1.700	....	6.250	....	....	....
11/24/88	....	....	....	....	....	....	....	....	....
12/01/88	21.200	2.500	....	2.200	....	5.910	0.111	....	....
12/08/88	21.300	2.100	....	2.800	....	6.030	0.105	....	....
12/15/88	13.100	2.700	....	2.200	....	5.020	0.414	....	....
12/22/88	23.300	2.400	....	1.500	....	4.700	LT 0.051	....	....
12/29/88	....	....	....	....	....	....	....	....	....
01/04/89	23.700	2.400	....	1.500	....	6.800	LT 0.051	....	....
01/11/89	28.000	2.800	....	1.700	....	6.900	0.076	....	....
01/18/89	25.800	2.350	LT 0.550	1.500	LT 1.370	5.150	0.076	170	2.740
01/25/89	19.200	2.200	....	1.300	....	6.100	LT 0.051	....	....
02/01/89	21.700	3.000	....	2.000	....	7.400	0.247	....	....
02/08/89	22.500	2.500	....	1.400	....	6.800	LT 0.051	....	....
02/15/89	22.600	3.200	....	2.000	....	4.820	0.088	....	....
02/22/89	28.700	....	....	....	....	4.310	....	....	....
03/01/89	....	2.000	....	1.600	....	6.800	0.076	....	....
03/08/89	16.400	1.700	....	1.600	....	10.000	LT 0.051	....	....
03/15/89	....	2.300	....	1.900	....	6.800	0.084	....	....
03/22/89	11.700	1.400	....	0.940	....	5.800	LT 0.051	....	....
03/29/89	17.100	1.700	....	1.900	....	6.200	....	....	....
04/05/89	16.800	2.400	....	1.300	....	6.500	0.080	....	....
04/12/89	22.200	1.900	....	1.500	....	5.400	0.069	....	....
04/19/89	17.400	2.600	....	1.000	....	6.200	0.107	....	....
04/26/89	21.500	2.400	....	4.600	....	5.900	0.125	....	....
05/03/89	20.000	1.600	....	1.200	....	5.800	LT 0.051	....	....
05/10/89	LT 1.340	2.400	....	2.000	....	5.900	0.241	....	....
05/17/89	18.600	2.500	....	3.100	....	5.600	0.088	....	....
05/24/89	27.900	2.100	....	3.300	....	5.300	0.113	....	....
05/31/89	18.900	2.800	....	3.000	....	5.200	0.122	....	....
06/07/89	27.100	3.200	....	1.700	....	4.800	0.129	....	....
06/14/89	15.700	2.200	....	1.800	....	5.500	0.192	....	....
06/21/89	19.850	1.469	0.562	1.256	LT 1.370	5.270	0.520	LT 1.470	....
06/28/89	19.800	2.100	....	2.800	....	4.720	0.101	....	....
07/05/89	11.400	2.400	....	1.400	....	4.980	0.125	....	....
07/12/89	LT 1.340	LT 0.050	....	LT 0.050	....	4.060	LT 0.051	....	....
07/19/89	14.200	2.200	....	1.000	....	4.810	0.988	....	....
07/26/89	....	2.400	....	1.800	....	4.860	0.112	....	....
08/02/89	23.100	2.100	....	1.100	....	9.960	0.131	....	....
08/09/89	13.800	1.400	....	1.000	....	4.590	0.199	....	....
08/16/89	19.900	1.900	....	2.200	....	4.580	0.133	....	....
08/23/89	28.800	2.300	....	2.100	....	4.330	0.328	....	....
08/30/89	24.600	2.400	....	1.900	....	6.600	0.117	....	....
09/06/89	18.400	2.500	....	1.700	....	4.930	0.115	....	....
09/13/89	28.100	0.579	....	1.500	....	5.800	LT 0.051	....	....
09/20/89	16.800	3.200	....	2.000	....	6.400	0.245	....	....
09/27/89	18.500	2.100	....	1.200	....	6.400	LT 0.051	....	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED
ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - ADSORBER A FOR FY 89

SAMPLE DATE	OXAT ug/l	PPDDE ug/l	PPDDT ug/l	PRTHN ug/l	SO4 mg/l	SUPONA ug/l	TCLEE ug/l	TRCLE ug/l	XYLEN ug/l
10/06/88	4.350	....	....	....	....	....	....	4.400	....
10/13/88	5.110	....	....	....	....	....	....	4.960	....
10/20/88	4.770	....	....	....	....	....	....	....	....
10/27/88	4.800	....	....	....	....	....	....	4.490	....
11/03/88	LT 2.380	....	....	....	....	....	....	3.860	....
11/10/88	4.910	....	....	....	....	....	....	6.320	....
11/17/88	5.310	....	....	....	....	....	....	5.000	....
11/24/88	....	....	....	....	....	....	....	....	....
12/01/88	4.510	....	....	....	....	....	....	4.410	....
12/08/88	6.070	....	....	....	....	....	....	3.650	....
12/15/88	LT 2.380	....	....	....	....	....	....	3.780	....
12/22/88	6.210	....	....	....	....	....	....	6.200	....
12/29/88	....	....	....	....	....	....	....	....	....
01/04/89	LT 2.380	....	....	....	....	....	....	4.440	....
01/11/89	5.330	....	....	....	....	....	....	4.770	....
01/18/89	5.670	LT 0.054	LT 0.049	LT 0.647	220	17.990	....	5.020	1.920
01/25/89	LT 2.380	....	....	....	....	....	....	2.880	....
02/01/89	4.270	....	....	....	....	....	....	5.630	....
02/08/89	4.990	....	....	....	....	....	....	4.670	....
02/15/89	4.330	....	....	....	....	....	....	3.780	....
02/22/89	5.600	....	....	....	....	....	....	5.140	....
03/01/89	....	....	....	....	....	....	....	4.290	....
03/08/89	3.610	....	....	....	....	....	....	4.350	....
03/15/89	LT 2.380	....	....	....	....	....	....	4.230	....
03/22/89	3.130	....	....	....	....	....	....	3.920	....
03/29/89	3.870	....	....	....	....	....	....	4.290	....
04/05/89	4.430	....	....	....	....	....	....	3.960	....
04/12/89	4.230	....	....	....	....	....	....	4.120	....
04/19/89	4.470	....	....	....	....	....	....	3.490	....
04/26/89	4.940	....	....	....	....	....	....	3.030	....
05/03/89	5.040	....	....	....	....	....	....	....	....
05/10/89	5.430	....	....	....	....	....	....	4.100	....
05/17/89	4.950	....	....	....	....	....	....	4.080	....
05/24/89	5.500	....	....	....	....	....	....	4.260	....
05/31/89	6.180	....	....	....	....	....	....	4.490	....
06/07/89	4.310	....	....	....	....	....	....	3.490	....
06/14/89	4.470	....	....	....	....	....	....	2.890	....
06/21/89	5.200	LT 0.054	0.820	10.800	420	....	36.400	4.525	LT 1.360
06/28/89	5.020	....	....	....	....	....	....	3.880	....
07/05/89	4.690	....	....	....	....	....	....	2.760	....
07/12/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
07/19/89	3.890	....	....	....	....	....	....	3.710	....
07/26/89	7.920	....	....	....	....	....	....	4.920	....
08/02/89	4.260	....	....	....	....	....	....	5.020	....
08/09/89	3.330	....	....	....	....	....	....	3.900	....
08/16/89	4.260	....	....	....	....	....	....	4.190	....
08/23/89	4.600	....	....	....	....	....	....	5.210	....
08/30/89	3.550	....	....	....	....	....	....	4.400	....
09/06/89	3.340	....	....	....	....	....	....	2.570	....
09/13/89	4.380	....	....	....	....	....	....	4.650	....
09/20/89	3.980	....	....	....	....	....	....	4.270	....
09/27/89	4.060	....	....	....	....	....	....	4.150	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED
ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - ADSORBER B FOR FY 89

SAMPLE DATE	111TCE ug/l	112TCE ug/l	11DCE ug/l	11DCLE ug/l	12DCE ug/l	12DCLE ug/l	13DMB ug/l	ALDRN ug/l
10/06/88	....	....	....	....	....	....	....	....
10/13/88	....	....	....	....	....	....	....	LT 0.050
10/20/88	....	....	....	....	....	....	....	....
10/27/88	....	....	....	....	....	....	....	....
11/03/88	....	....	....	....	....	....	....	....
11/10/88	....	....	....	....	....	....	....	....
11/17/88	....	....	....	....	....	....	....	....
11/24/88	....	....	....	....	....	....	....	....
12/01/88	....	....	....	....	....	....	....	0.060
12/08/88	....	....	....	....	....	....	....	LT 0.050
12/15/88	....	....	....	....	....	....	....	0.297
12/22/88	....	....	....	....	....	....	....	0.071
12/29/88	....	....	....	....	....	....	....	....
01/04/89	....	....	....	....	....	....	....	0.093
01/11/89	....	....	....	....	....	....	....	0.072
01/18/89	LT 0.760	LT 0.780	LT 1.700	LT 0.730	LT 0.760	LT 1.100	LT 1.320	LT 0.050
01/25/89	....	....	....	....	....	....	....	LT 0.050
02/01/89	....	....	....	....	....	....	....	LT 0.050
02/08/89	....	....	....	....	....	....	....	LT 0.050
02/15/89	....	....	....	....	....	....	....	LT 0.050
02/22/89	....	....	....	....	....	....	....	....
03/01/89	....	....	....	....	....	....	....	0.067
03/08/89	....	....	....	....	....	....	....	LT 0.050
03/15/89	....	....	....	....	....	....	....	LT 0.050
03/22/89	....	....	....	....	....	....	....	LT 0.050
03/29/89	....	....	....	....	....	....	....	LT 0.050
04/05/89	....	....	....	....	....	....	....	LT 0.050
04/12/89	....	....	....	....	....	....	....	LT 0.050
04/19/89	....	....	....	....	....	....	....	LT 0.050
04/26/89	....	....	....	....	....	....	....	LT 0.050
05/03/89	....	....	....	....	....	....	....	LT 0.050
05/10/89	....	....	....	....	....	....	....	LT 0.050
05/17/89	....	....	....	....	....	....	....	LT 0.050
05/24/89	....	....	....	....	....	....	....	LT 0.050
05/31/89	....	....	....	....	....	....	....	LT 0.050
06/07/89	....	....	....	....	....	....	....	LT 0.050
06/14/89	....	....	....	....	....	....	....	LT 0.050
06/21/89	LT 0.760	LT 0.780	LT 1.700	LT 0.730	LT 0.760	LT 1.100	LT 1.320	LT 0.050
06/28/89	....	....	....	....	....	....	....	LT 0.050
07/05/89	....	....	....	....	....	....	....	LT 0.050
07/12/89	....	....	....	....	....	....	....	LT 0.050
07/19/89	....	....	....	....	....	....	....	LT 0.050
07/26/89	....	....	....	....	....	....	....	LT 0.050
08/02/89	....	....	....	....	....	....	....	LT 0.050
08/09/89	....	....	....	....	....	....	....	....
08/16/89	....	....	....	....	....	....	....	LT 0.050
08/23/89	....	....	....	....	....	....	....	LT 0.050
08/30/89	....	....	....	....	....	....	....	LT 0.050
09/06/89	....	....	....	....	....	....	....	LT 0.050
09/13/89	....	....	....	....	....	....	....	LT 0.050
09/20/89	....	....	....	....	....	....	....	LT 0.050
09/27/89	....	....	....	....	....	....	....	LT 0.050

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED
ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - ADSORBER B FOR FY 89

SAMPLE DATE	ATZ ug/l	BCHPO ug/l	BTZ ug/l	C6H6 ug/l	CCL4 ug/l	CH2CL2 ug/l	CHCL3 ug/l	CHLORIDE mg/l	CL6CP ug/l
10/06/88	....	....	....	....	....	....	....	99.000	....
10/13/88	....	....	....	....	....	....	....	....	....
10/20/88	....	....	....	....	....	....	....	94.000	....
10/27/88	....	....	....	....	....	....	....	100	....
11/03/88	....	....	....	....	....	....	....	84.000	....
11/10/88	....	....	....	....	....	....	....	120	....
11/17/88	....	....	....	....	....	....	....	110	....
11/24/88	....	....	....	....	....	....	....	....	....
12/01/88	....	....	....	....	....	....	....	110	....
12/08/88	....	....	....	....	....	....	....	120	....
12/15/88	....	....	....	....	....	....	....	120	....
12/22/88	....	....	....	....	....	....	....	110	....
12/29/88	....	....	....	....	....	....	....	....	....
01/04/89	....	....	....	....	....	....	....	110	....
01/11/89	....	....	....	....	....	....	....	110	....
01/18/89	LT 4.030	....	LT 5.000	LT 1.050	LT 0.990	LT 7.400	9.030	110	LT 0.048
01/25/89	....	....	....	....	....	....	....	110	....
02/01/89	....	....	....	....	....	....	....	100	....
02/08/89	....	....	....	....	....	....	....	110	....
02/15/89	....	....	....	....	....	....	....	120	....
02/22/89	....	....	....	....	....	....	....	92.000	....
03/01/89	....	....	....	....	....	....	....	130	....
03/08/89	....	....	....	....	....	....	....	140	....
03/15/89	....	....	....	....	....	....	....	120	....
03/22/89	....	....	....	....	....	....	....	120	....
03/29/89	....	....	....	....	....	....	....	130	....
04/05/89	....	....	....	....	....	....	....	130	....
04/12/89	....	....	....	....	....	....	....	130	....
04/19/89	....	....	....	....	....	....	....	140	....
04/26/89	....	....	....	....	....	....	....	110	....
05/03/89	....	....	....	....	....	....	....	130	....
05/10/89	....	....	....	....	....	....	....	150	....
05/17/89	....	....	....	....	....	....	....	140	....
05/24/89	....	....	....	....	....	....	....	130	....
05/31/89	....	....	....	....	....	....	....	140	....
06/07/89	....	....	....	....	....	....	....	120	....
06/14/89	....	....	....	....	....	....	....	120	....
06/21/89	....	13.500	LT 5.000	LT 1.050	LT 0.990	LT 7.400	11.500	150	0.212
06/28/89	....	....	....	....	....	....	....	150	....
07/05/89	....	....	....	....	....	....	....	150	....
07/12/89	....	....	....	....	....	....	....	150	....
07/19/89	....	....	....	....	....	....	....	120	....
07/26/89	....	....	....	....	....	....	....	170	....
08/02/89	....	....	....	....	....	....	....	89.000	....
08/09/89	....	....	....	....	....	....	....	140	....
08/16/89	....	....	....	....	....	....	....	150	....
08/23/89	....	....	....	....	....	....	....	180	....
08/30/89	....	....	....	....	....	....	....	240	....
09/06/89	....	....	....	....	....	....	....	230	....
09/13/89	....	....	....	....	....	....	....	160	....
09/20/89	....	....	....	....	....	....	....	200	....
09/27/89	....	....	....	....	....	....	....	210	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED
ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - ADSORBER B FOR FY 89

SAMPLE DATE	CLC6H5 ug/l	CLDAN ug/l	CPMS ug/l	CPMSO ug/l	CPMSO2 ug/l	DBCP ug/l	DCPD ug/l	DDVP ug/l	DIMP ug/l
10/06/88	....	....	LT 5.690	LT 11.500	LT 7.460	0.454	....	....	75.300
10/13/88	....	....	LT 5.690	LT 11.500	LT 7.460	0.494	....	....	74.300
10/20/88	....	....	LT 5.690	LT 11.500	LT 7.460	....	LT 5.000	....	....
10/27/88	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	46.600
11/03/88	....	....	LT 5.690	LT 11.500	LT 7.460	0.267	LT 5.000	....	63.600
11/10/88	....	....	LT 5.690	12.300	LT 7.460	LT 0.195	LT 5.000	....	91.600
11/17/88	....	....	LT 5.690	LT 11.500	LT 7.460	0.539	12.500	....	87.700
11/24/88	....	....	....	....	....	....	....	....	....
12/01/88	....	....	LT 5.690	LT 11.500	LT 7.460	0.469	11.500	....	92.700
12/08/88	....	....	LT 5.690	LT 11.500	LT 7.460	0.460	15.500	....	100
12/15/88	....	....	LT 5.690	LT 11.500	LT 7.460	0.818	13.500	....	100
12/22/88	....	....	LT 5.690	LT 11.500	LT 7.460	0.437	9.440	....	85.400
12/29/88	....	....	....	....	....	....	....	....	....
01/04/89	....	....	LT 5.690	LT 11.500	LT 7.460	0.453	13.600	....	7.810
01/11/89	....	....	LT 5.690	LT 11.500	LT 7.460	0.474	12.300	....	81.900
01/18/89	LT 0.820	LT 0.095	LT 5.690	LT 11.500	LT 7.460	0.419	14.700	LT 0.384	82.400
01/25/89	....	....	LT 5.690	LT 11.500	LT 7.460	0.379	13.900	....	89.700
02/01/89	....	....	LT 5.690	LT 11.500	LT 7.460	0.385	13.700	....	28.900
02/08/89	....	....	LT 5.690	15.500	LT 7.460	0.465	17.700	....	100
02/15/89	....	....	LT 5.690	LT 11.500	LT 7.460	0.430	15.500	....	98.900
02/22/89	....	....	LT 5.690	LT 11.500	LT 7.460	0.386	LT 5.000	....	68.200
03/01/89	....	....	....	....	....	....	18.400	....	....
03/08/89	....	....	LT 5.690	12.000	LT 7.460	LT 0.195	19.100	....	75.000
03/15/89	....	....	LT 5.690	27.400	LT 7.460	LT 0.195	16.300	....	120
03/22/89	....	....	LT 5.690	14.000	LT 7.460	0.469	....	....	99.000
03/29/89	....	....	LT 5.690	12.300	LT 7.460	0.477	17.400	....	95.000
04/05/89	....	....	LT 5.690	17.200	LT 7.460	0.519	20.700	....	79.000
04/12/89	....	....	LT 5.690	LT 11.500	LT 7.460	0.550	15.200	....	91.100
04/19/89	....	....	LT 5.690	14.200	LT 7.460	LT 0.195	18.900	....	92.000
04/26/89	....	....	LT 5.690	LT 11.500	LT 7.460	0.601	15.800	....	90.500
05/03/89	....	....	LT 5.690	20.200	LT 7.460	0.568	21.800	....	87.000
05/10/89	....	....	LT 5.690	22.000	LT 7.460	0.513	16.400	....	74.000
05/17/89	....	....	LT 5.690	13.200	LT 7.460	0.839	19.600	....	78.400
05/24/89	....	....	LT 5.690	15.400	LT 7.460	0.498	21.800	....	....
05/31/89	....	....	LT 5.690	22.900	LT 7.460	0.508	23.100	....	110
06/07/89	....	....	LT 5.690	19.200	LT 7.460	0.495	23.300	....	120
06/14/89	....	....	LT 5.690	21.800	LT 7.460	LT 0.195	22.500	....	110
06/21/89	LT 0.820	....	LT 5.690	18.150	LT 7.460	0.339	53.150	....	93.000
06/28/89	....	....	LT 5.690	LT 11.500	LT 7.460	0.326	20.200	....	130
07/05/89	....	....	LT 5.690	19.800	LT 7.460	LT 0.195	10.500	....	24.600
07/12/89	....	....	LT 5.690	26.400	LT 7.460	0.347	19.800	....	120
07/19/89	....	....	LT 5.690	LT 11.500	LT 7.460	0.249	LT 5.000	....	77.300
07/26/89	....	....	LT 5.690	25.400	LT 7.460	0.358	22.700	....	48.400
08/02/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	37.400
08/09/89	....	....	LT 5.690	14.600	LT 7.460	0.344	19.600	....	88.500
08/16/89	....	....	LT 5.690	33.000	LT 7.460	0.418	16.800	....	95.800
08/23/89	....	....	LT 5.690	25.000	LT 7.460	0.659	37.100	....	150
08/30/89	....	....	LT 5.690	20.900	LT 7.460	0.545	26.000	....	130
09/06/89	....	....	LT 5.690	LT 11.500	LT 7.460	0.630	37.500	....	190
09/13/89	....	....	LT 5.690	24.100	LT 7.460	0.572	11.300	....	140
09/20/89	....	....	LT 5.690	22.600	LT 7.460	0.492	....	....	110
09/27/89	....	....	LT 5.690	16.000	LT 7.460	0.475	34.000	....	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED
ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - ADSORBER B FOR FY 89

SAMPLE DATE	DITH ug/l	DLDRN ug/l	DMDS ug/l	ENDRN ug/l	ETC6H5 ug/l	FLUORIDE mg/l	ISODR ug/l	MEC6H5 ug/l	MLTHM ug/l
10/06/88	LT 1.340	1.600	....	1.200	....	3.640	....	....	....
10/13/88	6.310	0.331	....	0.596	....	....	LT 0.051	....	....
10/20/88	6.530	....	....	....	....	3.280	....	....	....
10/27/88	8.970	....	....	....	....	3.760	....	....	....
11/03/88	LT 1.340	2.700	....	4.300	....	3.540	....	....	....
11/10/88	LT 1.340	5.100	....	6.200	....	3.640	....	....	....
11/17/88	LT 1.340	4.400	....	5.800	....	3.770	....	....	....
11/24/88	....	....	....	....	....	....	....	....	....
12/01/88	LT 1.340	0.480	....	0.660	....	3.540	LT 0.051	....	....
12/08/88	LT 1.340	0.490	....	0.620	....	3.810	LT 0.051	....	....
12/15/88	LT 1.340	LT 0.250	....	0.840	....	3.490	LT 0.051	....	....
12/22/88	LT 1.340	0.646	....	0.470	....	3.440	0.217	....	....
12/29/88	....	....	....	....	....	....	....	....	....
01/04/89	LT 1.340	0.589	....	0.496	....	3.250	0.314	....	....
01/11/89	8.830	0.688	....	0.538	....	3.360	0.243	....	....
01/18/89	LT 1.340	0.549	LT 0.550	0.467	LT 1.370	3.280	0.259	4.170	LT 0.373
01/25/89	LT 1.340	0.497	....	0.403	....	3.060	0.190	....	....
02/01/89	LT 1.340	0.591	....	0.499	....	3.120	LT 0.051	....	....
02/08/89	LT 1.340	0.496	....	0.415	....	2.930	LT 0.051	....	....
02/15/89	LT 1.340	0.707	....	0.613	....	3.410	LT 0.051	....	....
02/22/89	LT 1.340	....	....	....	....	3.230	....	....	....
03/01/89	....	0.754	....	0.702	....	3.280	0.076	....	....
03/08/89	LT 1.340	0.579	....	0.701	....	3.110	0.200	....	....
03/15/89	LT 1.340	0.593	....	0.575	....	3.070	LT 0.051	....	....
03/22/89	LT 1.340	0.579	....	0.560	....	3.010	0.106	....	....
03/29/89	LT 1.340	0.554	....	0.717	....	2.930	0.206	....	....
04/05/89	LT 1.340	0.526	....	0.591	....	2.990	LT 0.051	....	....
04/12/89	LT 1.340	0.550	....	0.636	....	2.800	LT 0.051	....	....
04/19/89	LT 1.340	0.692	....	0.470	....	2.870	LT 0.051	....	....
04/26/89	LT 1.340	0.132	....	LT 0.050	....	2.880	LT 0.051	....	....
05/03/89	LT 1.340	0.577	....	0.516	....	2.620	LT 0.051	....	....
05/10/89	LT 1.340	0.698	....	0.784	....	2.870	LT 0.051	....	....
05/17/89	LT 1.340	0.646	....	0.811	....	2.760	LT 0.051	....	....
05/24/89	LT 1.340	0.608	....	0.540	....	2.510	LT 0.051	....	....
05/31/89	LT 1.340	0.699	....	0.680	....	2.360	LT 0.051	....	....
06/07/89	LT 1.340	0.540	....	0.812	....	2.170	LT 0.051	....	....
06/14/89	LT 1.340	0.628	....	0.641	....	2.250	LT 0.051	....	....
06/21/89	LT 1.340	1.439	LT 0.429	1.185	LT 1.370	3.250	0.073	LT 1.470	....
06/28/89	LT 1.340	0.549	....	0.820	....	3.030	LT 0.051	....	....
07/05/89	LT 1.340	0.137	....	0.105	....	3.430	LT 0.051	....	....
07/12/89	LT 1.340	0.692	....	0.520	....	3.410	LT 0.051	....	....
07/19/89	LT 1.340	0.219	....	0.148	....	3.320	LT 0.051	....	....
07/26/89	LT 1.340	0.603	....	0.344	....	3.340	LT 0.051	....	....
08/02/89	LT 1.340	0.179	....	0.128	....	3.260	LT 0.051	....	....
08/09/89	LT 1.340	0.514	....	0.370	....	3.430	LT 0.051	....	....
08/16/89	LT 1.340	0.553	....	0.499	....	3.350	LT 0.051	....	....
08/23/89	2.300	1.200	....	0.840	....	3.430	LT 0.051	....	....
08/30/89	2.030	0.920	....	0.580	....	3.470	LT 0.051	....	....
09/06/89	LT 1.340	0.840	....	0.769	....	3.390	LT 0.051	....	....
09/13/89	1.890	0.891	....	0.670	....	3.360	LT 0.051	....	....
09/20/89	1.620	1.000	....	0.810	....	3.460	LT 0.051	....	....
09/27/89	1.740	0.890	....	0.720	....	3.370	LT 0.051	....	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED
ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - ADSORBER B FOR FY 89

SAMPLE DATE	OXAT ug/l	PPODE ug/l	PPODT ug/l	PRTHN ug/l	SO4 mg/l	SUPONA ug/l	TCLEE ug/l	TRCLE ug/l	XYLEN ug/l
10/06/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
10/13/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
10/20/88	LT 2.380	....	....	....	....	....	....	....	....
10/27/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
11/03/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
11/10/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
11/17/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
11/24/88	....	....	....	....	....	....	....	....	....
12/01/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
12/08/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
12/15/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
12/22/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
12/29/88	....	....	....	....	....	....	....	....	....
01/04/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
01/11/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
01/18/89	LT 2.380	LT 0.054	LT 0.049	LT 0.647	440	2.489	....	LT 0.560	LT 1.360
01/25/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
02/01/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
02/08/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
02/15/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
02/22/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
03/01/89	....	....	....	....	....	....	....	LT 0.560	....
03/08/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
03/15/89	LT 2.380	....	....	....	....	....	....	0.732	....
03/22/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
03/29/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
04/05/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
04/12/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
04/19/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
04/26/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
05/03/89	LT 2.380	....	....	....	....	....	....	....	....
05/10/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
05/17/89	LT 2.380	....	....	....	....	....	....	0.876	....
05/24/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
05/31/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
06/07/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
06/14/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
06/21/89	LT 2.380	LT 0.054	0.323	2.000	500	....	8.090	LT 0.560	LT 1.360
06/28/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
07/05/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
07/12/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
07/19/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
07/26/89	LT 2.380	....	....	....	....	....	....	0.925	....
08/02/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
08/09/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
08/16/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
08/23/89	LT 2.380	....	....	....	....	....	....	0.732	....
08/30/89	LT 2.380	....	....	....	....	....	....	0.648	....
09/06/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
09/13/89	LT 2.380	....	....	....	....	....	....	0.632	....
09/20/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
09/27/89	LT 2.380	....	....	....	....	....	....	0.725	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED
ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - ADSORBER C FOR FY 89

SAMPLE DATE	111TCE ug/l	112TCE ug/l	11DCE ug/l	11DCLE ug/l	12DCE ug/l	12DCLE ug/l	13DMB ug/l	ALDRN ug/l
10/06/88	....	....	....	....	....	....	....	....
10/13/88	....	....	....	....	....	....	....	LT 0.050
10/20/88	....	....	....	....	....	....	....	....
10/27/88	....	....	....	....	....	....	....	LT 0.050
11/03/88	....	....	....	....	....	....	....	LT 0.050
11/10/88	....	....	....	....	....	....	....	LT 0.050
11/17/88	....	....	....	....	....	....	....	LT 0.050
11/24/88	....	....	....	....	....	....	....	....
12/01/88	....	....	....	....	....	....	....	LT 0.050
12/08/88	....	....	....	....	....	....	....	LT 0.050
12/15/88	....	....	....	....	....	....	....	LT 0.050
12/22/88	....	....	....	....	....	....	....	0.069
12/29/88	....	....	....	....	....	....	....	....
01/04/89	....	....	....	....	....	....	....	LT 0.050
01/11/89	....	....	....	....	....	....	....	LT 0.050
01/18/89	LT 0.760	LT 0.780	LT 1.700	LT 0.730	LT 0.760	LT 1.100	LT 1.320	LT 0.050
01/25/89	....	....	....	....	....	....	....	LT 0.050
02/01/89	....	....	....	....	....	....	....	LT 0.050
02/08/89	....	....	....	....	....	....	....	LT 0.050
02/15/89	....	....	....	....	....	....	....	LT 0.050
02/22/89	....	....	....	....	....	....	....	....
03/01/89	....	....	....	....	....	....	....	LT 0.050
03/08/89	....	....	....	....	....	....	....	LT 0.050
03/15/89	....	....	....	....	....	....	....	LT 0.050
03/22/89	....	....	....	....	....	....	....	LT 0.050
03/29/89	....	....	....	....	....	....	....	LT 0.050
04/05/89	....	....	....	....	....	....	....	LT 0.050
04/12/89	....	....	....	....	....	....	....	LT 0.050
04/19/89	....	....	....	....	....	....	....	LT 0.050
04/26/89	....	....	....	....	....	....	....	LT 0.050
05/03/89	....	....	....	....	....	....	....	LT 0.050
05/10/89	....	....	....	....	....	....	....	LT 0.050
05/17/89	....	....	....	....	....	....	....	LT 0.050
05/24/89	....	....	....	....	....	....	....	LT 0.050
05/31/89	....	....	....	....	....	....	....	LT 0.050
06/07/89	....	....	....	....	....	....	....	LT 0.050
06/14/89	....	....	....	....	....	....	....	LT 0.050
06/21/89	LT 0.760	LT 0.780	LT 1.700	LT 0.730	LT 0.760	LT 1.100	1.760	LT 0.050
06/28/89	....	....	....	....	....	....	....	LT 0.050
07/05/89	....	....	....	....	....	....	....	LT 0.050
07/12/89	....	....	....	....	....	....	....	LT 0.050
07/19/89	....	....	....	....	....	....	....	LT 0.050
07/26/89	....	....	....	....	....	....	....	LT 0.050
08/02/89	....	....	....	....	....	....	....	LT 0.050
08/09/89	....	....	....	....	....	....	....	....
08/16/89	....	....	....	....	....	....	....	LT 0.050
08/23/89	....	....	....	....	....	....	....	LT 0.050
08/30/89	....	....	....	....	....	....	....	LT 0.050
09/06/89	....	....	....	....	....	....	....	LT 0.050
09/13/89	....	....	....	....	....	....	....	LT 0.050
09/20/89	....	....	....	....	....	....	....	LT 0.050
09/27/89	....	....	....	....	....	....	....	LT 0.050

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED
ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - ADSORBER C FOR FY 89

SAMPLE DATE	ATZ ug/l	BCHPD ug/l	BTZ ug/l	C6H6 ug/l	CCL4 ug/l	CH2CL2 ug/l	CHCL3 ug/l	CHLORIDE mg/l	CL6CP ug/l
10/06/88	....	....	....	....	....	....	....	....	....
10/13/88	....	....	....	....	....	....	....	....	....
10/20/88	....	....	....	....	....	....	....	100	....
10/27/88	....	....	....	....	....	....	....	100	....
11/03/88	....	....	....	....	....	....	....	96.000	....
11/10/88	....	....	....	....	....	....	....	100	....
11/17/88	....	....	....	....	....	....	....	100	....
11/24/88	....	....	....	....	....	....	....	....	....
12/01/88	....	....	....	....	....	....	....	100	....
12/08/88	....	....	....	....	....	....	....	100	....
12/15/88	....	....	....	....	....	....	....	98.000	....
12/22/88	....	....	....	....	....	....	....	98.000	....
12/29/88	....	....	....	....	....	....	....	....	....
01/04/89	....	....	....	....	....	....	....	77.000	....
01/11/89	....	....	....	....	....	....	....	94.000	....
01/18/89	LT 4.030	....	LT 5.000	LT 1.050	2.110	LT 7.400	LT 0.500	96.000	LT 0.048
01/25/89	....	....	....	....	....	....	....	95.000	....
02/01/89	....	....	....	....	....	....	....	71.000	....
02/08/89	....	....	....	....	....	....	....	86.000	....
02/15/89	....	....	....	....	....	....	....	100	....
02/22/89	....	....	....	....	....	....	....	100	....
03/01/89	....	....	....	....	....	....	....	96.000	....
03/08/89	....	....	....	....	....	....	....	100	....
03/15/89	....	....	....	....	....	....	....	99.000	....
03/22/89	....	....	....	....	....	....	....	98.000	....
03/29/89	....	....	....	....	....	....	....	98.000	....
04/05/89	....	....	....	....	....	....	....	97.000	....
04/12/89	....	....	....	....	....	....	....	94.000	....
04/19/89	....	....	....	....	....	....	....	100	....
04/26/89	....	....	....	....	....	....	....	89.000	....
05/03/89	....	....	....	....	....	....	....	90.000	....
05/10/89	....	....	....	....	....	....	....	97.000	....
05/17/89	....	....	....	....	....	....	....	94.000	....
05/24/89	....	....	....	....	....	....	....	89.000	....
05/31/89	....	....	....	....	....	....	....	89.000	....
06/07/89	....	....	....	....	....	....	....	89.000	....
06/14/89	....	....	....	....	....	....	....	82.000	....
06/21/89	....	LT 5.900	LT 5.000	LT 1.050	LT 0.990	LT 7.400	0.568	100	LT 0.048
06/28/89	....	....	....	....	....	....	....	100	....
07/05/89	....	....	....	....	....	....	....	110	....
07/12/89	....	....	....	....	....	....	....	96.000	....
07/19/89	....	....	....	....	....	....	....	98.000	....
07/26/89	....	....	....	....	....	....	....	110	....
08/02/89	....	....	....	....	....	....	....	110	....
08/09/89	....	....	....	....	....	....	....	99.000	....
08/16/89	....	....	....	....	....	....	....	96.000	....
08/23/89	....	....	....	....	....	....	....	94.000	....
08/30/89	....	....	....	....	....	....	....	120	....
09/06/89	....	....	....	....	....	....	....	110	....
09/13/89	....	....	....	....	....	....	....	110	....
09/20/89	....	....	....	....	....	....	....	110	....
09/27/89	....	....	....	....	....	....	....	100	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED
ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - ADSORBER C FOR FY 89

SAMPLE DATE	CLC6H5 ug/l	CLDAN ug/l	CPMS ug/l	CPMSO ug/l	CPMSO2 ug/l	DBCP ug/l	DCPD ug/l	DDVP ug/l	DIMP ug/l
10/06/88	....	....	....	....	....	....	....	....	....
10/13/88	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	....	....	3.530
10/20/88	....	....	LT 5.690	LT 11.500	LT 7.460	....	LT 5.000	....	....
10/27/88	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	2.820
11/03/88	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	8.770
11/10/88	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	3.890
11/17/88	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	4.280
11/24/88	....	....	....	....	....	....	....	....	....
12/01/88	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	3.470
12/08/88	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	3.930
12/15/88	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	4.230
12/22/88	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	4.240
12/2· 88	....	....	....	....	....	....	....	....	....
01/(,89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	9.140
01/11/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	4.120
01/18/89	LT 0.820	LT 0.095	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	LT 0.384	3.930
01/25/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	4.340
02/01/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	3.820
02/08/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	3.990
02/15/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	3.610
02/22/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	4.260
03/01/89	....	....	....	....	....	....	LT 5.000	....	3.890
03/08/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	3.860
03/15/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	4.820
03/22/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	....	....	4.200
03/29/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	3.920
04/05/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	3.380
04/12/89	....	....	LT 5.690	16.900	LT 7.460	LT 0.195	LT 5.000	....	3.850
04/19/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	4.280
04/26/89	....	....	LT 5.690	26.400	18.100	LT 0.195	LT 5.000	....	3.160
05/03/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	3.280
05/10/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	3.610
05/17/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	3.200
05/24/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	....
05/31/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	4.530
06/07/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	4.280
06/14/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	3.240
06/21/89	LT 0.820	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	4.055
06/28/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	4.860
07/05/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	4.360
07/12/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	4.810
07/19/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	3.690
07/26/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	4.350
08/02/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	3.840
08/09/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	3.770
08/16/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	3.780
08/23/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	2.640
08/30/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	3.360
09/06/89	....	....	LT 5.690	23.300	LT 7.460	LT 0.195	LT 5.000	....	5.650
09/13/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	3.190
09/20/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	....	....	2.760
09/27/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED
ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - ADSORBER C FOR FY 89

SAMPLE DATE	DITH ug/l	DLDRN ug/l	DMDS ug/l	ENDRN ug/l	ETC6H5 ug/l	FLUORIDE mg/l	ISODR ug/l	MEC6H5 ug/l	MLTHN ug/l
10/06/88	....	....	....	....	....	....	....	....	....
10/13/88	LT 1.340	0.105	....	0.049	....	....	LT 0.051	....	....
10/20/88	6.320	....	....	....	....	2.350	....	....	....
10/27/88	LT 1.340	0.087	....	0.073	....	2.740	LT 0.051	....	....
11/03/88	LT 1.340	LT 0.050	....	LT 0.050	....	2.620	LT 0.051	....	....
11/10/88	LT 1.340	0.095	....	0.044	....	2.580	LT 0.051	....	....
11/17/88	LT 1.340	0.095	....	0.049	....	2.700	LT 0.051	....	....
11/24/88	....	....	....	....	....	....	....	....	....
12/01/88	LT 1.340	0.991	....	0.072	....	2.580	LT 0.051	....	....
12/08/88	LT 1.340	0.111	....	0.070	....	2.860	LT 0.051	....	....
12/15/88	LT 1.340	0.155	....	0.084	....	2.440	LT 0.051	....	....
12/22/88	LT 1.340	0.133	....	LT 0.050	....	2.290	LT 0.051	....	....
12/29/88	....	....	....	....	....	....	....	....	....
01/04/89	LT 1.340	0.092	....	LT 0.050	....	2.290	LT 0.051	....	....
01/11/89	LT 1.340	0.105	....	0.045	....	2.420	LT 0.051	....	....
01/18/89	LT 1.340	0.110	LT 0.550	LT 0.050	LT 1.370	2.380	LT 0.051	LT 1.470	LT 0.373
01/25/89	LT 1.340	0.096	....	LT 0.050	....	2.130	LT 0.051	....	....
02/01/89	LT 1.340	0.093	....	LT 0.050	....	2.170	0.337	....	....
02/08/89	LT 1.340	0.095	....	LT 0.050	....	2.040	LT 0.051	....	....
02/15/89	LT 1.340	0.120	....	LT 0.050	....	2.440	LT 0.051	....	....
02/22/89	LT 1.340	....	....	....	....	2.430	....	....	....
03/01/89	....	0.086	....	LT 0.050	....	2.330	LT 0.051	....	....
03/08/89	LT 1.340	0.077	....	LT 0.050	....	2.540	LT 0.051	....	....
03/15/89	LT 1.340	0.075	....	LT 0.050	....	2.250	LT 0.051	....	....
03/22/89	LT 1.340	0.071	....	LT 0.050	....	2.120	LT 0.051	....	....
03/29/89	LT 1.340	0.069	....	LT 0.050	....	2.130	LT 0.051	....	....
04/05/89	LT 1.340	0.067	....	LT 0.050	....	2.200	LT 0.051	....	....
04/12/89	LT 1.340	0.064	....	LT 0.050	....	2.080	LT 0.051	....	....
04/19/89	LT 1.340	0.120	....	0.041	....	2.090	LT 0.051	....	....
04/26/89	20.200	0.101	....	0.068	....	2.000	LT 0.051	....	....
05/03/89	LT 1.340	0.104	....	0.056	....	1.830	LT 0.051	....	....
05/10/89	LT 1.340	0.112	....	0.043	....	2.050	LT 0.051	....	....
05/17/89	LT 1.340	0.082	....	LT 0.050	....	1.980	LT 0.051	....	....
05/24/89	LT 1.340	0.059	....	0.046	....	1.790	LT 0.051	....	....
05/31/89	LT 1.340	0.075	....	LT 0.050	....	1.740	LT 0.051	....	....
06/07/89	LT 1.340	0.067	....	LT 0.050	....	1.630	LT 0.051	....	....
06/14/89	LT 1.340	0.082	....	LT 0.050	....	1.570	LT 0.051	....	....
06/21/89	LT 1.340	0.093	LT 0.429	0.059	LT 1.370	2.270	LT 0.051	LT 1.470	....
06/28/89	LT 1.340	0.079	....	LT 0.050	....	2.050	LT 0.051	....	....
07/05/89	LT 1.340	0.092	....	LT 0.050	....	2.520	LT 0.051	....	....
07/12/89	LT 1.340	0.111	....	LT 0.050	....	2.330	LT 0.051	....	....
07/19/89	LT 1.340	0.129	....	0.048	....	2.310	LT 0.051	....	....
07/26/89	LT 1.340	0.096	....	0.224	....	2.270	LT 0.051	....	....
08/02/89	LT 1.340	0.079	....	LT 0.050	....	2.380	LT 0.051	....	....
08/09/89	LT 1.340	0.091	....	LT 0.050	....	2.370	LT 0.051	....	....
08/16/89	LT 1.340	0.982	....	LT 0.050	....	2.360	LT 0.051	....	....
08/23/89	LT 1.340	0.086	....	LT 0.050	....	2.510	LT 0.051	....	....
08/30/89	LT 1.340	0.084	....	LT 0.050	....	2.360	LT 0.051	....	....
09/06/89	1.700	0.083	....	LT 0.050	....	2.100	LT 0.051	....	....
09/13/89	LT 1.340	0.094	....	LT 0.050	....	2.210	LT 0.051	....	....
09/20/89	LT 1.340	0.095	....	LT 0.050	....	2.350	LT 0.051	....	....
09/27/89	LT 1.340	0.110	....	LT 0.050	....	2.160	LT 0.051	....	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED
ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - ADSORBER C FOR FY 89

SAMPLE DATE	OXAT ug/l	PPDDE ug/l	PPDDT ug/l	PRTHN ug/l	SO4 mg/l	SUPONA ug/l	TCLEE ug/l	TRCLE ug/l	XYLEN ug/l
10/06/88	....	....	....	....	....	....	....	....	....
10/13/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
10/20/88	LT 2.380	....	....	....	....	....	....	....	....
10/27/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
11/03/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
11/10/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
11/17/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
11/24/88	....	....	....	....	....	....	....	....	....
12/01/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
12/08/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
12/15/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
12/22/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
12/29/88	....	....	....	....	....	....	....	....	....
01/04/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
01/11/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
01/18/89	LT 2.380	LT 0.054	LT 0.049	LT 0.647	410	LT 0.769	....	LT 0.560	LT 1.360
01/25/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
02/01/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
02/08/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
02/15/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
02/22/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
03/01/89	....	....	....	....	....	....	....	LT 0.560	....
03/08/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
03/15/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
03/22/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
03/29/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
04/05/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
04/12/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
04/19/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
04/26/89	5.120	....	....	....	....	....	....	LT 0.560	....
05/03/89	LT 2.380	....	....	....	....	....	....	....	....
05/10/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
05/17/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
05/24/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
05/31/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
06/07/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
06/14/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
06/21/89	LT 2.380	LT 0.054	LT 0.049	1.770	370	....	LT 0.750	LT 0.560	LT 1.360
06/28/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
07/05/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
07/12/89	LT 2.380	....	....	....	....	....	....	2.480	....
07/19/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
07/26/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
08/02/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
08/09/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
08/16/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
08/23/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
08/30/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
09/06/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
09/13/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
09/20/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
09/27/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED
ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - EFFLUENT FOR FY 89

SAMPLE DATE	111TCE ug/l	112TCE ug/l	11DCE ug/l	11DCLE ug/l	12DCE ug/l	12DCLE ug/l	13DMB ug/l	ALDRN ug/l
10/06/88	....	....	....	....	....	....	....	LT 0.050
10/13/88	....	....	....	....	....	....	....	LT 0.050
10/20/88	....	....	....	....	....	....	....	....
10/27/88	....	....	....	....	....	....	....	LT 0.050
11/03/88	....	....	....	....	....	....	....	LT 0.050
11/10/88	....	....	....	....	....	....	....	LT 0.050
11/17/88	....	....	....	....	....	....	....	LT 0.050
11/24/88	....	....	....	....	....	....	....	....
12/01/88	....	....	....	....	....	....	....	LT 0.050
12/08/88	....	....	....	....	....	....	....	LT 0.050
12/15/88	....	....	....	....	....	....	....	LT 0.050
12/22/88	....	....	....	....	....	....	....	LT 0.050
12/29/88	....	....	....	....	....	....	....	....
01/04/89	....	....	....	....	....	....	....	LT 0.050
01/11/89	....	....	....	....	....	....	....	LT 0.050
01/18/89	LT 0.760	LT 0.780	LT 1.700	LT 0.730	LT 0.760	LT 1.100	LT 1.320	LT 0.050
01/25/89	....	....	....	....	....	....	....	LT 0.050
02/01/89	....	....	....	....	....	....	....	LT 0.050
02/08/89	....	....	....	....	....	....	....	LT 0.050
02/15/89	....	....	....	....	....	....	....	LT 0.050
02/22/89	....	....	....	....	....	....	....	....
03/01/89	....	....	....	....	....	....	....	LT 0.050
03/08/89	....	....	....	....	....	....	....	LT 0.050
03/15/89	....	....	....	....	....	....	....	LT 0.050
03/22/89	....	....	....	....	....	....	....	LT 0.050
03/29/89	....	....	....	....	....	....	....	LT 0.050
04/05/89	....	....	....	....	....	....	....	LT 0.050
04/12/89	....	....	....	....	....	....	....	LT 0.050
04/19/89	....	....	....	....	....	....	....	LT 0.050
04/26/89	....	....	....	....	....	....	....	LT 0.050
05/03/89	....	....	....	....	....	....	....	LT 0.050
05/10/89	....	....	....	....	....	....	....	LT 0.050
05/17/89	....	....	....	....	....	....	....	LT 0.050
05/24/89	....	....	....	....	....	....	....	LT 0.050
05/31/89	....	....	....	....	....	....	....	LT 0.050
06/07/89	....	....	....	....	....	....	....	LT 0.050
06/14/89	....	....	....	....	....	....	....	LT 0.050
06/21/89	LT 0.760	LT 0.780	LT 1.700	LT 0.730	LT 0.760	LT 1.100	LT 1.320	LT 0.050
06/28/89	....	....	....	....	....	....	....	LT 0.050
07/05/89	....	....	....	....	....	....	....	LT 0.050
07/12/89	....	....	....	....	....	....	....	LT 0.050
07/19/89	....	....	....	....	....	....	....	LT 0.050
07/26/89	....	....	....	....	....	....	....	LT 0.050
08/02/89	....	....	....	....	....	....	....	LT 0.050
08/09/89	....	....	....	....	....	....	....	....
08/16/89	....	....	....	....	....	....	....	LT 0.050
08/23/89	....	....	....	....	....	....	....	LT 0.050
08/30/89	....	....	....	....	....	....	....	LT 0.050
09/06/89	....	....	....	....	....	....	....	LT 0.050
09/13/89	....	....	....	....	....	....	....	LT 0.050
09/20/89	....	....	....	....	....	....	....	LT 0.050
09/27/89	....	....	....	....	....	....	....	LT 0.050

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED
ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - EFFLUENT FOR FY 89

SAMPLE DATE	ATZ ug/l	BCHPD ug/l	BTZ ug/l	C6H6 ug/l	CCL4 ug/l	CH2CL2 ug/l	CHCL3 ug/l	CHLORIDE mg/l	CL6CP ug/l
10/06/88	....	....	....	....	....	....	....	100	....
10/13/88	....	....	....	....	....	....	....	....	....
10/20/88	....	....	....	....	....	....	....	250	....
10/27/88	....	....	....	....	....	....	....	280	....
11/03/88	....	....	....	....	....	....	....	240	....
11/10/88	....	....	....	....	....	....	....	290	....
11/17/88	....	....	....	....	....	....	....	270	....
11/24/88	....	....	....	....	....	....	....	....	....
12/01/88	....	....	....	....	....	....	....	260	....
12/08/88	....	....	....	....	....	....	....	260	....
12/15/88	....	....	....	....	....	....	....	220	....
12/22/88	....	....	....	....	....	....	....	240	....
12/29/88	....	....	....	....	....	....	....	....	....
01/04/89	....	....	....	....	....	....	....	250	....
01/11/89	....	....	....	....	....	....	....	240	....
01/18/89	LT 4.030	....	LT 5.000	1.370	LT 0.990	LT 7.400	LT 0.500	250	LT 0.048
01/25/89	....	....	....	....	....	....	....	210	....
02/01/89	....	....	....	....	....	....	....	190	....
02/08/89	....	....	....	....	....	....	....	200	....
02/15/89	....	....	....	....	....	....	....	240	....
02/22/89	....	....	....	....	....	....	....	210	....
03/01/89	....	....	....	....	....	....	....	220	....
03/08/89	....	....	....	....	....	....	....	230	....
03/15/89	....	....	....	....	....	....	....	230	....
03/22/89	....	....	....	....	....	....	....	250	....
03/29/89	....	....	....	....	....	....	....	230	....
04/05/89	....	....	....	....	....	....	....	230	....
04/12/89	....	....	....	....	....	....	....	240	....
04/19/89	....	....	....	....	....	....	....	230	....
04/26/89	....	....	....	....	....	....	....	250	....
05/03/89	....	....	....	....	....	....	....	270	....
05/10/89	....	....	....	....	....	....	....	300	....
05/17/89	....	....	....	....	....	....	....	260	....
05/24/89	....	....	....	....	....	....	....	260	....
05/31/89	....	....	....	....	....	....	....	270	....
06/07/89	....	....	....	....	....	....	....	260	....
06/14/89	....	....	....	....	....	....	....	280	....
06/21/89	....	LT 5.900	LT 5.000	LT 1.050	LT 0.990	LT 7.400	0.800	320	LT 0.048
06/28/89	....	....	....	....	....	....	....	270	....
07/05/89	....	....	....	....	....	....	....	340	....
07/12/89	....	....	....	....	....	....	....	290	....
07/19/89	....	....	....	....	....	....	....	300	....
07/26/89	....	....	....	....	....	....	....	330	....
08/02/89	....	....	....	....	....	....	....	270	....
08/09/89	....	....	....	....	....	....	....	300	....
08/16/89	....	....	....	....	....	....	....	290	....
08/23/89	....	....	....	....	....	....	....	280	....
08/30/89	....	....	....	....	....	....	....	370	....
09/06/89	....	....	....	....	....	....	....	240	....
09/13/89	....	....	....	....	....	....	....	350	....
09/20/89	....	....	....	....	....	....	....	330	....
09/27/89	....	....	....	....	....	....	....	160	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED
ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - EFFLUENT FOR FY 89

SAMPLE DATE	CLC6H5 ug/l	CLDAN ug/l	CPMS ug/l	CPMSO ug/l	CPMSO2 ug/l	DBCP ug/l	DCPD ug/l	DDVP ug/l	DIMP ug/l
10/06/88	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	....	....	LT 0.650
10/13/88	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	....	....	1.580
10/20/88	....	....	LT 5.690	LT 11.500	LT 7.460	....	LT 5.000	....	....
10/27/88	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	4.760
11/03/88	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	1.530
11/10/88	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	1.990
11/17/88	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	2.040
11/24/88	....	....	....	....	....	....	....	....	....
12/01/88	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	1.070
12/08/88	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	1.310
12/15/88	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	2.430
12/22/88	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	1.390
12/29/88	....	....	....	....	....	....	....	....	....
01/04/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	1.590
01/11/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	2.280
01/18/89	LT 0.820	LT 0.095	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	LT 0.384	4.270
01/25/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	2.010
02/01/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	10.700
02/08/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	1.880
02/15/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	3.460
02/22/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	2.390
03/01/89	....	....	....	....	....	....	LT 5.000	....	2.110
03/08/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	2.720
03/15/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	4.650
03/22/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	....	....	1.850
03/29/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	1.960
04/05/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	1.720
04/12/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	1.690
04/19/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	2.080
04/26/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	1.640
05/03/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	1.510
05/10/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	1.770
05/17/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	2.260
05/24/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	2.260
05/31/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	2.090
06/07/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	2.010
06/14/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	1.860
06/21/89	LT 0.820	LT 0.095	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	1.800
06/28/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	3.180
07/05/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	2.380
07/12/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	3.180
07/19/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	....
07/26/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	2.470
08/02/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	2.280
08/09/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	1.610
08/16/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	2.190
08/23/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	2.180
08/30/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	5.610
09/06/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	2.740
09/13/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	1.840
09/20/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	....	....	2.040
09/27/89	....	....	LT 5.690	LT 11.500	LT 7.460	LT 0.195	LT 5.000	....	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED

ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - EFFLUENT FOR FY 89

SAMPLE DATE	DITH ug/l	DLDRN ug/l	DMDS ug/l	ENDRN ug/l	ETC6H5 ug/l	FLUORIDE mg/l	ISODR ug/l	MEC6H5 ug/l	MLTHN ug/l
10/06/88	LT 1.340	LT 0.050	....	LT 0.050	....	3.910	LT 0.051	....	....
10/13/88	LT 1.340	LT 0.050	....	LT 0.050	....	....	LT 0.051	....	....
10/20/88	LT 1.340	....	....	....	....	3.430	....	....	....
10/27/88	LT 1.340	LT 0.050	....	LT 0.050	....	4.020	LT 0.051	....	....
11/03/88	LT 1.340	LT 0.050	....	LT 0.050	....	3.740	LT 0.051	....	....
11/10/88	LT 1.340	LT 0.050	....	LT 0.050	....	4.010	LT 0.051	....	....
11/17/88	LT 1.340	LT 0.050	....	LT 0.050	....	4.050	LT 0.051	....	....
11/24/88	....	....	....	....	....	....	....	....	....
12/01/88	LT 1.340	LT 0.050	....	LT 0.050	....	3.760	LT 0.051	....	....
12/08/88	LT 1.340	LT 0.050	....	LT 0.050	....	3.860	LT 0.051	....	....
12/15/88	LT 1.340	LT 0.050	....	LT 0.050	....	3.420	LT 0.051	....	....
12/22/88	LT 1.340	LT 0.050	....	LT 0.050	....	3.500	LT 0.051	....	....
12/29/88	....	....	....	....	....	....	....	....	....
01/04/89	LT 1.340	LT 0.050	....	LT 0.050	....	3.080	LT 0.051	....	....
01/11/89	LT 1.340	LT 0.050	....	LT 0.050	....	3.170	LT 0.051	....	....
01/18/89	LT 1.340	LT 0.050	LT 0.550	LT 0.050	LT 1.370	3.165	LT 0.051	LT 1.470	LT 0.373
01/25/89	LT 1.340	LT 0.050	....	LT 0.050	....	2.920	LT 0.051	....	....
02/01/89	LT 1.340	LT 0.050	....	LT 0.050	....	2.860	LT 0.051	....	....
02/08/89	LT 1.340	LT 0.050	....	LT 0.050	....	2.700	LT 0.051	....	....
02/15/89	LT 1.340	LT 0.050	....	LT 0.050	....	3.510	LT 0.051	....	....
02/22/89	LT 1.340	....	....	....	....	2.990	....	....	....
03/01/89	....	LT 0.050	....	LT 0.050	....	3.280	LT 0.051	....	....
03/08/89	LT 1.340	LT 0.050	....	LT 0.050	....	3.210	LT 0.051	....	....
03/15/89	LT 1.340	LT 0.050	....	LT 0.050	....	3.070	LT 0.051	....	....
03/22/89	LT 1.340	LT 0.050	....	LT 0.050	....	2.880	LT 0.051	....	....
03/29/89	LT 1.340	LT 0.050	....	LT 0.050	....	2.850	LT 0.051	....	....
04/05/89	LT 1.340	LT 0.050	....	LT 0.050	....	2.730	LT 0.051	....	....
04/12/89	LT 1.340	LT 0.050	....	LT 0.050	....	2.750	LT 0.051	....	....
04/19/89	LT 1.340	LT 0.050	....	LT 0.050	....	2.540	LT 0.051	....	....
04/26/89	LT 1.340	0.439	....	LT 0.050	....	2.610	LT 0.051	....	....
05/03/89	LT 1.340	LT 0.050	....	LT 0.050	....	2.370	LT 0.051	....	....
05/10/89	LT 1.340	LT 0.050	....	LT 0.050	....	2.810	LT 0.051	....	....
05/17/89	LT 1.340	LT 0.050	....	LT 0.050	....	2.570	LT 0.051	....	....
05/24/89	LT 1.340	LT 0.050	....	LT 0.050	....	3.400	LT 0.051	....	....
05/31/89	LT 1.340	LT 0.050	....	LT 0.050	....	3.100	LT 0.051	....	....
06/07/89	LT 1.340	LT 0.050	....	LT 0.050	....	3.200	LT 0.051	....	....
06/14/89	LT 1.340	LT 0.050	....	LT 0.050	....	3.600	LT 0.051	....	....
06/21/89	LT 1.340	LT 0.050	LT 0.429	LT 0.050	LT 1.370	3.350	LT 0.051	LT 1.470	....
06/28/89	LT 1.340	LT 0.050	....	LT 0.050	....	2.920	LT 0.051	....	....
07/05/89	LT 1.340	LT 0.050	....	LT 0.050	....	3.540	LT 0.051	....	....
07/12/89	LT 1.340	LT 0.050	....	LT 0.050	....	3.190	LT 0.051	....	....
07/19/89	LT 1.340	LT 0.050	....	LT 0.050	....	3.420	LT 0.051	....	....
07/26/89	LT 1.340	LT 0.050	....	LT 0.050	....	3.200	LT 0.051	....	....
08/02/89	LT 1.340	LT 0.050	....	LT 0.050	....	3.260	LT 0.051	....	....
08/09/89	LT 1.340	LT 0.050	....	LT 0.050	....	3.250	LT 0.051	....	....
08/16/89	LT 1.340	LT 0.050	....	LT 0.050	....	3.320	LT 0.051	....	....
08/23/89	LT 1.340	LT 0.050	....	LT 0.050	....	3.370	LT 0.051	....	....
08/30/89	LT 1.340	LT 0.050	....	LT 0.050	....	3.570	LT 0.051	....	....
09/06/89	LT 1.340	LT 0.050	....	LT 0.050	....	3.180	LT 0.051	....	....
09/13/89	LT 1.340	LT 0.050	....	LT 0.050	....	3.380	LT 0.051	....	....
09/20/89	LT 1.340	LT 0.050	....	LT 0.050	....	3.340	LT 0.051	....	....
09/27/89	LT 1.340	LT 0.050	....	LT 0.050	....	2.750	LT 0.051	....	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED
ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - EFFLUENT FOR FY 89

SAMPLE DATE	OXAT ug/l	PPDDE ug/l	PPDDT ug/l	PRTHN ug/l	SO4 mg/l	SUPONA ug/l	TCLEE ug/l	TRCLE ug/l	XYLEN ug/l
10/06/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
10/13/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
10/20/88	LT 2.380	....	....	....	....	....	....	....	....
10/27/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
11/03/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
11/10/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
11/17/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
11/24/88	....	....	....	....	....	....	....	....	....
12/01/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
12/08/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
12/15/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
12/22/88	LT 2.380	....	....	....	....	....	....	LT 0.560	....
12/29/88	....	....	....	....	....	....	....	....	....
01/04/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
01/11/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
01/18/89	LT 2.380	LT 0.054	LT 0.049	LT 0.647	380	LT 0.769	....	LT 0.560	LT 1.360
01/25/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
02/01/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
02/08/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
02/15/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
02/22/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
03/01/89	....	....	....	....	....	....	....	LT 0.560	....
03/08/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
03/15/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
03/22/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
03/29/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
04/05/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
04/12/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
04/19/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
04/26/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
05/03/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
05/10/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
05/17/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
05/24/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
05/31/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
06/07/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
06/14/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
06/21/89	LT 2.380	LT 0.054	LT 0.049	LT 0.647	410	....	LT 0.750	LT 0.560	LT 1.360
06/28/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
07/05/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
07/12/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
07/19/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
07/26/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
08/02/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
08/09/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
08/16/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
08/23/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
08/30/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
09/06/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
09/13/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
09/20/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....
09/27/89	LT 2.380	....	....	....	....	....	....	LT 0.560	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED
ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - ADSORBER A FOR FY 89
METALS

SAMPLE DATE	AS ug/l	CA ug/l	CD ug/l	CR ug/l	CU ug/l	HG ug/l	K ug/l	MG ug/l	NA ug/l
10/06/88	....	....	....	....	....	....	....	....	....
10/13/88	....	....	....	....	....	....	....	....	....
10/20/88	....	....	....	....	....	....	....	....	....
10/27/88	....	....	....	....	....	....	....	....	....
11/03/88	....	....	....	....	....	....	....	....	....
11/10/88	....	....	....	....	....	....	....	....	....
11/17/88	....	....	....	....	....	....	....	....	....
11/24/88	....	....	....	....	....	....	....	....	....
12/01/88	....	....	....	....	....	....	....	....	....
12/08/88	....	....	....	....	....	....	....	....	....
12/15/88	....	....	....	....	....	....	....	....	....
12/22/88	....	....	....	....	....	....	....	....	....
12/29/88	....	....	....	....	....	....	....	....	....
01/04/89	....	....	....	....	....	....	....	....	....
01/11/89	....	....	....	....	....	....	....	....	....
01/18/89	2.970	280,000	LT 8.400	LT 24.000	LT 26.000	0.204	4,510	130,000	....
01/25/89	....	....	....	....	....	....	....	....	....
02/01/89	....	....	....	....	....	....	....	....	....
02/08/89	....	....	....	....	....	....	....	....	....
02/15/89	....	....	....	....	....	....	....	....	....
02/22/89	....	....	....	....	....	....	....	....	....
03/01/89	....	....	....	....	....	....	....	....	....
03/08/89	....	....	....	....	....	....	....	....	....
03/15/89	....	....	....	....	....	....	....	....	....
03/22/89	....	....	....	....	....	....	....	....	....
03/29/89	....	....	....	....	....	....	....	....	....
04/05/89	....	....	....	....	....	....	....	....	....
04/12/89	....	....	....	....	....	....	....	....	....
04/19/89	....	....	....	....	....	....	....	....	....
04/26/89	....	....	....	....	....	....	....	....	....
05/03/89	....	....	....	....	....	....	....	....	....
05/10/89	....	....	....	....	....	....	....	....	....
05/17/89	....	....	....	....	....	....	....	....	....
05/24/89	....	....	....	....	....	....	....	....	....
05/31/89	....	....	....	....	....	....	....	....	....
06/07/89	....	....	....	....	....	....	....	....	....
06/14/89	....	....	....	....	....	....	....	....	....
06/21/89	LT 2.350	310,000	LT 6.780	LT 16.800	LT 11.900	0.109	5,970	69,502	520,000
06/28/89	....	....	....	....	....	....	....	....	....
07/05/89	....	....	....	....	....	....	....	....	....
07/12/89	....	....	....	....	....	....	....	....	....
07/19/89	....	....	....	....	....	....	....	....	....
07/26/89	....	....	....	....	....	....	....	....	....
08/02/89	....	....	....	....	....	....	....	....	....
08/09/89	....	....	....	....	....	....	....	....	....
08/16/89	....	....	....	....	....	....	....	....	....
08/23/89	....	....	....	....	....	....	....	....	....
08/30/89	....	....	....	....	....	....	....	....	....
09/06/89	....	....	....	....	....	....	....	....	....
09/13/89	....	....	....	....	....	....	....	....	....
09/20/89	....	....	....	....	....	....	....	....	....
09/27/89	....	....	....	....	....	....	....	....	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED
ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - ADSORBER A FOR FY 89
METALS

SAMPLE DATE	PB ug/l	ZN ug/l
10/06/88	....	....
10/13/88	....	....
10/20/88	....	....
10/27/88	....	....
11/03/88	....	....
11/10/88	....	....
11/17/88	....	....
11/24/88	....	....
12/01/88	....	....
12/08/88	....	....
12/15/88	....	....
12/22/88	....	....
12/29/88	....	....
01/04/89	....	....
01/11/89	....	....
01/18/89	LT 39.235	LT 22.000
01/25/89	....	....
02/01/89	....	....
02/08/89	....	....
02/15/89	....	....
02/22/89	....	....
03/01/89	....	....
03/08/89	....	....
03/15/89	....	....
03/22/89	....	....
03/29/89	....	....
04/05/89	....	....
04/12/89	....	....
04/19/89	....	....
04/26/89	....	....
05/03/89	....	....
05/10/89	....	....
05/17/89	....	....
05/24/89	....	....
05/31/89	....	....
06/07/89	....	....
06/14/89	....	....
06/21/89	LT 43.400	LT 18.000
06/28/89	....	....
07/05/89	....	....
07/12/89	....	....
07/19/89	....	....
07/26/89	....	....
08/02/89	....	....
08/09/89	....	....
08/16/89	....	....
08/23/89	....	....
08/30/89	....	....
09/06/89	....	....
09/13/89	....	....
09/20/89	....	....
09/27/89	....	....

LT = LESS THAN The Following Concentration
ug/l = MICROGRAM PER LITER
.... INDICATES THAT ANALYSIS WAS NOT PERFORMED
mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - ADSORBER B FOR FY 89
METALS

SAMPLE DATE	AS ug/l	CA ug/l	CD ug/l	CR ug/l	CU ug/l	HG ug/l	K ug/l	MG ug/l	NA ug/l
10/06/88	....	....	....	....	....	....	....	....	....
10/13/88	....	....	....	....	....	....	....	....	....
10/20/88	....	....	....	....	....	....	....	....	....
10/27/88	....	....	....	....	....	....	....	....	....
11/03/88	....	....	....	....	....	....	....	....	....
11/10/88	....	....	....	....	....	....	....	....	....
11/17/88	....	....	....	....	....	....	....	....	....
11/24/88	....	....	....	....	....	....	....	....	....
12/01/88	....	....	....	....	....	....	....	....	....
12/08/88	....	....	....	....	....	....	....	....	....
12/15/88	....	....	....	....	....	....	....	....	....
12/22/88	....	....	....	....	....	....	....	....	....
12/29/88	....	....	....	....	....	....	....	....	....
01/04/89	....	....	....	....	....	....	....	....	....
01/11/89	....	....	....	....	....	....	....	....	....
01/18/89	LT 2.350	110,000	LT 8.400	LT 24.000	LT 26.000	0.278	2,500	49,600	....
01/25/89	....	....	....	....	....	....	....	....	....
02/01/89	....	....	....	....	....	....	....	....	....
02/08/89	....	....	....	....	....	....	....	....	....
02/15/89	....	....	....	....	....	....	....	....	....
02/22/89	....	....	....	....	....	....	....	....	....
03/01/89	....	....	....	....	....	....	....	....	....
03/08/89	....	....	....	....	....	....	....	....	....
03/15/89	....	....	....	....	....	....	....	....	....
03/22/89	....	....	....	....	....	....	....	....	....
03/29/89	....	....	....	....	....	....	....	....	....
04/05/89	....	....	....	....	....	....	....	....	....
04/12/89	....	....	....	....	....	....	....	....	....
04/19/89	....	....	....	....	....	....	....	....	....
04/26/89	....	....	....	....	....	....	....	....	....
05/03/89	....	....	....	....	....	....	....	....	....
05/10/89	....	....	....	....	....	....	....	....	....
05/17/89	....	....	....	....	....	....	....	....	....
05/24/89	....	....	....	....	....	....	....	....	....
05/31/89	....	....	....	....	....	....	....	....	....
06/07/89	....	....	....	....	....	....	....	....	....
06/14/89	....	....	....	....	....	....	....	....	....
06/21/89	LT 2.350	129,000	LT 6.780	LT 16.800	LT 11.900	LT 0.100	3,250	31,605	200,000
06/28/89	....	....	....	....	....	....	....	....	....
07/05/89	....	....	....	....	....	....	....	....	....
07/12/89	....	....	....	....	....	....	....	....	....
07/19/89	....	....	....	....	....	....	....	....	....
07/26/89	....	....	....	....	....	....	....	....	....
08/02/89	....	....	....	....	....	....	....	....	....
08/09/89	....	....	....	....	....	....	....	....	....
08/16/89	....	....	....	....	....	....	....	....	....
08/23/89	....	....	....	....	....	....	....	....	....
08/30/89	....	....	....	....	....	....	....	....	....
09/06/89	....	....	....	....	....	....	....	....	....
09/13/89	....	....	....	....	....	....	....	....	....
09/20/89	....	....	....	....	....	....	....	....	....
09/27/89	....	....	....	....	....	....	....	....	....

LT = LESS THAN The Following Concentration
.... INDICATES THAT ANALYSIS WAS NOT PERFORMED
ug/l = MICROGRAM PER LITER
mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - ADSORBER B FOR FY 89
METALS

SAMPLE DATE	PB ug/l	ZN ug/l
10/06/88	....	....
10/13/88	....	....
10/20/88	....	....
10/27/88	....	....
11/03/88	....	....
11/10/88	....	....
11/17/88	....	....
11/24/88	....	....
12/01/88	....	....
12/08/88	....	....
12/15/88	....	....
12/22/88	....	....
12/29/88	....	....
01/04/89	....	....
01/11/89	....	....
01/18/89	LT 39.235	LT 22.000
01/25/89	....	....
02/01/89	....	....
02/08/89	....	....
02/15/89	....	....
02/22/89	....	....
03/01/89	....	....
03/08/89	....	....
03/15/89	....	....
03/22/89	....	....
03/29/89	....	....
04/05/89	....	....
04/12/89	....	....
04/19/89	....	....
04/26/89	....	....
05/03/89	....	....
05/10/89	....	....
05/17/89	....	....
05/24/89	....	....
05/31/89	....	....
06/07/89	....	....
06/14/89	....	....
06/21/89	LT 43.400	LT 18.000
06/28/89	....	....
07/05/89	....	....
07/12/89	....	....
07/19/89	....	....
07/26/89	....	....
08/02/89	....	....
08/09/89	....	....
08/16/89	....	....
08/23/89	....	....
08/30/89	....	....
09/06/89	....	....
09/13/89	....	....
09/20/89	....	....
09/27/89	....	....

LT = LESS THAN The Following Concentration
ug/l = MICROGRAM PER LITER
.... INDICATES THAT ANALYSIS WAS NOT PERFORMED
mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - ADSORBER C FOR FY 89

METALS

SAMPLE DATE	AS ug/l	CA ug/l	CD ug/l	CR ug/l	CU ug/l	HG ug/l	K ug/l	MG ug/l	NA ug/l
10/06/88	....	....	....	....	....	....	....	....	....
10/13/88	....	....	....	....	....	....	....	....	....
10/20/88	....	....	....	....	....	....	....	....	....
10/27/88	....	....	....	....	....	....	....	....	....
11/03/88	....	....	....	....	....	....	....	....	....
11/10/88	....	....	....	....	....	....	....	....	....
11/17/88	....	....	....	....	....	....	....	....	....
11/24/88	....	....	....	....	....	....	....	....	....
12/01/88	....	....	....	....	....	....	....	....	....
12/08/88	....	....	....	....	....	....	....	....	....
12/15/88	....	....	....	....	....	....	....	....	....
12/22/88	....	....	....	....	....	....	....	....	....
12/29/88	....	....	....	....	....	....	....	....	....
01/04/89	....	....	....	....	....	....	....	....	....
01/11/89	....	....	....	....	....	....	....	....	....
01/18/89	LT 2.350	120,000	LT 8.400	LT 24.000	LT 26.000	LT 0.100	2,060	42,700	....
01/25/89	....	....	....	....	....	....	....	....	....
02/01/89	....	....	....	....	....	....	....	....	....
02/08/89	....	....	....	....	....	....	....	....	....
02/15/89	....	....	....	....	....	....	....	....	....
02/22/89	....	....	....	....	....	....	....	....	....
03/01/89	....	....	....	....	....	....	....	....	....
03/08/89	....	....	....	....	....	....	....	....	....
03/15/89	....	....	....	....	....	....	....	....	....
03/22/89	....	....	....	....	....	....	....	....	....
03/29/89	....	....	....	....	....	....	....	....	....
04/05/89	....	....	....	....	....	....	....	....	....
04/12/89	....	....	....	....	....	....	....	....	....
04/19/89	....	....	....	....	....	....	....	....	....
04/26/89	....	....	....	....	....	....	....	....	....
05/03/89	....	....	....	....	....	....	....	....	....
05/10/89	....	....	....	....	....	....	....	....	....
05/17/89	....	....	....	....	....	....	....	....	....
05/24/89	....	....	....	....	....	....	....	....	....
05/31/89	....	....	....	....	....	....	....	....	....
06/07/89	....	....	....	....	....	....	....	....	....
06/14/89	....	....	....	....	....	....	....	....	....
06/21/89	LT 2.350	111,000	LT 6.780	LT 16.800	LT 11.900	0.109	2,680	21,952	180,000
06/28/89	....	....	....	....	....	....	....	....	....
07/05/89	....	....	....	....	....	....	....	....	....
07/12/89	....	....	....	....	....	....	....	....	....
07/19/89	....	....	....	....	....	....	....	....	....
07/26/89	....	....	....	....	....	....	....	....	....
08/02/89	....	....	....	....	....	....	....	....	....
08/09/89	....	....	....	....	....	....	....	....	....
08/16/89	....	....	....	....	....	....	....	....	....
08/23/89	....	....	....	....	....	....	....	....	....
08/30/89	....	....	....	....	....	....	....	....	....
09/06/89	....	....	....	....	....	....	....	....	....
09/13/89	....	....	....	....	....	....	....	....	....
09/20/89	....	....	....	....	....	....	....	....	....
09/27/89	....	....	....	....	....	....	....	....	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED

ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - ADSORBER C FOR FY 89
METALS

SAMPLE DATE	PB ug/l	ZN ug/l
10/06/88	....	....
10/13/88	....	....
10/20/88	....	....
10/27/88	....	....
11/03/88	....	....
11/10/88	....	....
11/17/88	....	....
11/24/88	....	....
12/01/88	....	....
12/08/88	....	....
12/15/88	....	....
12/22/88	....	....
12/29/88	....	....
01/04/89	....	....
01/11/89	....	....
01/18/89	LT 39.235	LT 22.000
01/25/89	....	....
02/01/89	....	....
02/08/89	....	....
02/15/89	....	....
02/22/89	....	....
03/01/89	....	....
03/08/89	....	....
03/15/89	....	....
03/22/89	....	....
03/29/89	....	....
04/05/89	....	....
04/12/89	....	....
04/19/89	....	....
04/26/89	....	....
05/03/89	....	....
05/10/89	....	....
05/17/89	....	....
05/24/89	....	....
05/31/89	....	....
06/07/89	....	....
06/14/89	....	....
06/21/89	LT 43.400	LT 18.000
06/28/89	....	....
07/05/89	....	....
07/12/89	....	....
07/19/89	....	....
07/26/89	....	....
08/02/89	....	....
08/09/89	....	....
08/16/89	....	....
08/23/89	....	....
08/30/89	....	....
09/06/89	....	....
09/13/89	....	....
09/20/89	....	....
09/27/89	....	....

LT = LESS THAN The Following Concentration
.... INDICATES THAT ANALYSIS WAS NOT PERFORMED
ug/l = MICROGRAM PER LITER
mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - EFFLUENT FOR FY 89

METALS

SAMPLE DATE	AS ug/l	CA ug/l	CD ug/l	CR ug/l	CU ug/l	HG ug/l	K ug/l	MG ug/l	NA ug/l
10/06/88	....	....	....	....	....	....	....	....	....
10/13/88	....	....	....	....	....	....	....	....	....
10/20/88	....	....	....	....	....	....	....	....	....
10/27/88	....	....	....	....	....	....	....	....	....
11/03/88	....	....	....	....	....	....	....	....	....
11/10/88	....	....	....	....	....	....	....	....	....
11/17/88	....	....	....	....	....	....	....	....	....
11/24/88	....	....	....	....	....	....	....	....	....
12/01/88	....	....	....	....	....	....	....	....	....
12/08/88	....	....	....	....	....	....	....	....	....
12/15/88	....	....	....	....	....	....	....	....	....
12/22/88	....	....	....	....	....	....	....	....	....
12/29/88	....	....	....	....	....	....	....	....	....
01/04/89	....	....	....	....	....	....	....	....	....
01/11/89	....	....	....	....	....	....	....	....	....
01/18/89	LT 2.350	140,000	LT 8.400	LT 24.000	LT 26.000	0.237	2,710	61,500	....
01/25/89	....	....	....	....	....	....	....	....	....
02/01/89	....	....	....	....	....	....	....	....	....
02/08/89	....	....	....	....	....	....	....	....	....
02/15/89	....	....	....	....	....	....	....	....	....
02/22/89	....	....	....	....	....	....	....	....	....
03/01/89	....	....	....	....	....	...	....	....	....
03/08/89	....	....	....	....	....	....	....	....	....
03/15/89	....	....	....	....	....	....	....	....	....
03/22/89	....	....	....	....	....	....	....	....	....
03/29/89	....	....	....	....	....	....	....	....	....
04/05/89	....	....	....	....	....	....	....	....	....
04/12/89	....	....	....	....	....	....	....	....	....
04/19/89	....	....	....	....	....	....	....	....	....
04/26/89	....	....	....	....	....	....	....	....	....
05/03/89	....	....	....	....	....	....	....	....	....
05/10/89	....	....	....	....	....	....	....	....	....
05/17/89	....	....	....	....	....	....	....	....	....
05/24/89	....	....	....	....	....	....	....	....	....
05/31/89	....	....	....	....	....	....	....	....	....
06/07/89	....	....	....	....	....	....	....	....	....
06/14/89	....	....	....	....	....	....	....	....	....
06/21/89	LT 2.350	153,000	LT 6.780	LT 16.800	LT 11.900	0.147	2,730	35,602	270,000
06/28/89	....	....	....	....	....	....	....	....	....
07/05/89	....	....	....	....	....	....	....	....	....
07/12/89	....	....	....	....	....	....	....	....	....
07/19/89	....	....	....	....	....	....	....	....	....
07/26/89	....	....	....	....	....	....	....	....	....
08/02/89	....	....	....	....	....	....	....	....	....
08/09/89	....	....	....	....	....	....	....	....	....
08/16/89	....	....	....	....	....	....	....	....	....
08/23/89	....	....	....	....	....	....	....	....	....
08/30/89	....	....	....	....	....	....	....	....	....
09/06/89	....	....	....	....	....	....	....	....	....
09/13/89	....	....	....	....	....	....	....	....	....
09/20/89	....	....	....	....	....	....	....	....	....
09/27/89	....	....	....	....	....	....	....	....	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED

ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTH BOUNDARY TREATMENT PLANT - EFFLUENT FOR FY 89
METALS

SAMPLE DATE	PB ug/l	ZN ug/l
10/06/88	....	....
10/13/88	....	....
10/20/88	....	....
10/27/88	....	....
11/03/88	....	....
11/10/88	....	....
11/17/88	....	....
11/24/88	....	....
12/01/88	....	....
12/08/88	....	....
12/15/88	....	....
12/22/88	....	....
12/29/88	....	....
01/04/89	....	....
01/11/89	....	....
01/18/89	LT 39.235	29.200
01/25/89	....	....
02/01/89	....	....
02/08/89	....	....
02/15/89	....	....
02/22/89	....	....
03/01/89	....	....
03/08/89	....	....
03/15/89	....	....
03/22/89	....	....
03/29/89	....	....
04/05/89	....	....
04/12/89	....	....
04/19/89	....	....
04/26/89	....	....
05/03/89	....	....
05/10/89	....	....
05/17/89	....	....
05/24/89	....	....
05/31/89	....	....
06/07/89	....	....
06/14/89	....	....
06/21/89	LT 43.400	LT 18.000
06/28/89	....	....
07/05/89	....	....
07/12/89	....	....
07/19/89	....	....
07/26/89	....	....
08/02/89	....	....
08/09/89	....	....
08/16/89	....	....
08/23/89	....	....
08/30/89	....	....
09/06/89	....	....
09/13/89	....	....
09/20/89	....	....
09/27/89	....	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED
ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

D.P.A.

09/28/90

DATACHEM
FY 89 STATISTICAL SUMMARY
NORTH BOUNDARY SYSTEM

SITE: PNAAIN

ANALYTE	TOT SAMP	SAMP >CRL	% > CRL	MTH NO.	CERTIFIED REPORT LIMIT (LT)	UOM	MEAN	LOW VALUE	HIGH VALUE
111TCE	2	0	0%	N8	0.76	UGL	LT CRL	LT CRL	LT CRL
112TCE	2	0	0%	N8	0.78	UGL	LT CRL	LT CRL	LT CRL
11DCE	2	0	0%	N8	1.70	UGL	LT CRL	LT CRL	LT CRL
11DCLE	2	0	0%	N8	0.73	UGL	LT CRL	LT CRL	LT CRL
12DCE	2	0	0%	N8	0.76	UGL	LT CRL	LT CRL	LT CRL
12DCLE	2	2	100%	N8		UGL	4.66	4.60	4.7
13DMB	2	0	0%	AV8	1.32	UGL	LT CRL	LT CRL	LT CRL
ALDRN	39	23	59%	KK8	0.05, 0.25	UGL	LT CRL	LT CRL	5.40
AS	2	1	50%	AX8	2.35	UGL	LT CRL	LT CRL	2.97
ATZ	1	1	100%	UH11		UGL	38.90	38.90	38.90
BCHPD	1	0	0%	P8	5.90	UGL	LT CRL	LT CRL	LT CRL
BTZ	2	0	0%	AAA8	5.00	UGL	LT CRL	LT CRL	LT CRL
C6H6	2	0	0%	AV8	1.05	UGL	LT CRL	LT CRL	LT CRL
CA	2	2	100%	GG8, SS12		UGL	295,000.00	999.00	310,000
CCL4	2	0	0%	N8	0.99	UGL	LT CRL	LT CRL	LT CRL
CD	2	0	0%	GG8, SS12	8.40, 6.78	UGL	LT CRL	LT CRL	LT CRL
CH2CL2	2	0	0%	N8	7.40	UGL	LT CRL	LT CRL	LT CRL
CHCL3	2	2	100%	N8		UGL	3.11	2.30	3.91
CL	48	48	100%	HH8A, TT09		MGL	848.96	700.00	1,000
CL6CP	2	1	50%	KK8	0.05	UGL	LT CRL	LT CRL	1.30
CLC6H5	2	0	0%	N8	0.82	UGL	LT CRL	LT CRL	LT CRL
CLDAN	1	0	0%	KK8	0.10	UGL	LT CRL	LT CRL	LT CRL
CPMS	49	7	14%	AAA8	5.69	UGL	LT CRL	LT CRL	8.17
CPMSO	49	47	96%	AAA8	11.5	UGL	37.07	LT CRL	60.10
CPMSO2	48	44	92%	AAA8	7.46	UGL	36.29	LT CRL	74.10
CR	2	0	0%	GG8, SS12	24.0, 16.8	UGL	LT CRL	LT CRL	LT CRL
CU	2	0	0%	GG8, SS12	26.0, 11.9	UGL	LT CRL	LT CRL	LT CRL
DBCP	48	43	90%	AY8	0.20	UGL	0.69	LT CRL	1.31
DCPD	46	45	98%	P8	5.00	UGL	333.48	LT CRL	500.00
DDVP	1	0	0%	UH11	0.38	UGL	LT CRL	LT CRL	LT CRL
DIMP	46	45	98%	AW8A, AT8	0.65	UGL	803.60	LT CRL	1,100
DITH	47	44	94%	AAA8	1.34	UGL	19.46	LT CRL	28.80
DLDRN	48	47	98%	KK8	0.05	UGL	2.14	LT CRL	3.20
DMDS	2	1	50%	AAA8	0.55	UGL	LT CRL	LT CRL	0.56
ENDRN	48	47	98%	KK8	0.05	UGL	1.77	LT CRL	4.60
ETC6H5	2	0	0%	AV8	1.37	UGL	LT CRL	LT CRL	LT CRL
F	49	49	100%	HH8A, TT09		MGL	5.86	4.06	10.00
HG	2	2	100%	CC8		UGL	0.16	0.11	0.20
ISODR	43	32	74%	KK8	0.05	UGL	0.15	LT CRL	0.99
K	2	2	100%	GG8, SS12		UGL	5,240.00	999.00	5,970
MEC6H5	2	1	50%	AV8	1.47	UGL	LT CRL	LT CRL	170.00
MG	2	2	100%	GG8, SS12		UGL	99,751.23	999.00	130,000
MLTHN	1	1	100%	UH11		UGL	2.74	2.74	2.74
NA	1	1	100%	SS12		UGL	520,000.00	999.00	520,000
OXAT	49	43	88%	AAA8	2.38	UGL	4.44	LT CRL	7.92
PB	2	0	0%	GG8, SS12	39.2, 43.4	UGL	LT CRL	LT CRL	LT CRL

D.P.A.

09/28/90

DATACHEM
FY 89 STATISTICAL SUMMARY
NORTH BOUNDARY SYSTEM

SITE: PNAAIN

ANALYTE	TOT SAMP	SAMP >CRL	% > CRL	MTH NO.	CERTIFIED REPORT LIMIT (LT)	UOM	MEAN	LOW VALUE	HIGH VALUE
PPDDE	2	0	0%	KK8	0.05	UGL	LT CRL	LT CRL	LT CRL
PPDDT	2	1	50%	KK8	0.05	UGL	LT CRL	LT CRL	0.[illegible]
PRTHN	2	1	50%	UH11	0.65	UGL	LT CRL	LT CRL	10.[illegible]
SO4	2	2	100%	HH8A		MGL	320.00	220.00	420.00
SUPONA	1	1	100%	UH11		UGL	17.99	17.99	17.[illegible]
TCLEE	1	1	100%	N8		UGL	36.40	36.40	36.[illegible]
TRCLE	48	47	98%	N8	0.56	UGL	4.19	LT CRL	6.32
XYLEN	2	1	50%	AV8	1.36	UGL	LT CRL	LT CRL	1.92
ZN	2	0	0%	GG8, SS12	22.0, 18.0	UGL	LT CRL	LT CRL	LT CR[illegible]

D.P.A.

09/28/90

DATACHEM
FY 89 STATISTICAL SUMMARY
NORTH BOUNDARY SYSTEM

SITE: PNABIN

ANALYTE	TOT SAMP	SAMP >CRL	% > CRL	MTH NO.	CERTIFIED REPORT LIMIT (LT)	UOM	MEAN	LOW VALUE	HIGH VALUE
111TCE	2	0	0%	N8	0.76	UGL	LT CRL	LT CRL	LT CRL
112TCE	2	0	0%	N8	0.78	UGL	LT CRL	LT CRL	LT CRL
11DCE	2	0	0%	N8	1.70	UGL	LT CRL	LT CRL	LT CRL
11DCLE	2	0	0%	N8	0.73	UGL	LT CRL	LT CRL	LT CRL
12DCE	2	0	0%	N8	0.76	UGL	LT CRL	LT CRL	LT CRL
12DCLE	2	0	0%	N8	1.10	UGL	LT CRL	LT CRL	LT CRL
13DMB	2	0	0%	AV8	1.32	UGL	LT CRL	LT CRL	LT CRL
ALDRN	42	6	14%	KK8	0.05	UGL	LT CRL	LT CRL	0.30
AS	2	0	0%	AX8	2.35	UGL	LT CRL	LT CRL	LT CRL
ATZ	1	0	0%	UH11	4.03	UGL	LT CRL	LT CRL	LT CRL
BCHPD	1	1	100%	P8		UGL	13.50	13.50	13.50
BTZ	2	0	0%	AAA8	5.00	UGL	LT CRL	LT CRL	LT CRL
C6H6	2	0	0%	AV8	1.05	UGL	LT CRL	LT CRL	LT CRL
CA	2	2	100%	GG8, SS12		UGL	119,500.00	999.00	129,000
CCL4	2	0	0%	N8	0.99	UGL	LT CRL	LT CRL	LT CRL
CD	2	0	0%	GG8, SS12	8.40, 6.78	UGL	LT CRL	LT CRL	LT CRL
CH2CL2	2	0	0%	N8	7.40	UGL	LT CRL	LT CRL	LT CRL
CHCL3	2	2	100%	N8		UGL	10.27	9.03	11.50
CL	49	49	100%	HH8A, TT09		MGL	132.61	84.00	240.00
CL6CP	2	1	50%	KK8	0.05	UGL	LT CRL	LT CRL	0.21
CLC6H5	2	0	0%	N8	0.82	UGL	LT CRL	LT CRL	LT CRL
CLDAN	1	0	0%	KK8	0.10	UGL	LT CRL	LT CRL	LT CRL
CPMS	49	0	0%	AAA8	5.69	UGL	LT CRL	LT CRL	LT CRL
CPMSO	49	26	53%	AAA8	11.5	UGL	LT CRL	LT CRL	33.00
CPMSO2	49	0	0%	AAA8	7.46	UGL	LT CRL	LT CRL	LT CRL
CR	2	0	0%	GG8, SS12	24.0, 16.8	UGL	LT CRL	LT CRL	LT CRL
CU	2	0	0%	GG8, SS12	26.0, 11.9	UGL	LT CRL	LT CRL	LT CRL
DBCP	48	40	83%	AY8	0.20	UGL	0.43	LT CRL	0.84
DCPD	46	39	85%	P8	5.00	UGL	17.34	LT CRL	53.15
DDVP	1	0	0%	UH11	0.38	UGL	LT CRL	LT CRL	LT CRL
DIMP	46	46	100%	AW8A, AT8		UGL	89.80	7.81	190.00
DITH	49	9	18%	AAA8	1.34	UGL	LT CRL	LT CRL	8.97
DLDRN	47	46	98%	KK8	0.25	UGL	0.85	LT CRL	5.10
DMDS	2	0	0%	AAA8	0.55, 0.43	UGL	LT CRL	LT CRL	LT CRL
ENDRN	47	46	98%	KK8	0.05	UGL	0.90	LT CRL	6.20
ETC6H5	2	0	0%	AV8	1.37	UGL	LT CRL	LT CRL	LT CRL
F	49	49	100%	HH8A, TT09		MGL	3.19	2.17	3.81
HG	2	1	50%	CC8	0.10	UGL	LT CRL	LT CRL	0.28
ISODR	43	10	23%	KK8	0.05	UGL	LT CRL	LT CRL	0.31
K	2	2	100%	GG8, SS12		UGL	2,875.00	999.00	3,250
MEC6H5	2	1	50%	AV8	1.47	UGL	LT CRL	LT CRL	4.1[illegible]
MG	2	2	100%	GG8, SS12		UGL	40,602.48	999.00	49,600
MLTHN	1	0	0%	UH11	0.37	UGL	LT CRL	LT CRL	LT CRL
NA	1	1	100%	SS12		UGL	200,000.00	999.00	200,000
OXAT	49	0	0%	AAA8	2.38	UGL	LT CRL	LT CRL	LT CRL
PB	2	0	0%	GG8, SS12	39.2, 43.4	UGL	LT CRL	LT CRL	LT CRL

D.P.A.

09/28/90

DATACHEM
FY 89 STATISTICAL SUMMARY
NORTH BOUNDARY SYSTEM

SITE: PNABIN

ANALYTE	TOT SAMP	SAMP >CRL	% > CRL	MTH NO.	CERTIFIED REPORT LIMIT (LT)	UOM	MEAN	LOW VALUE	HIGH VALUE
PPDDE	2	0	0%	KK8	0.05	UGL	LT CRL	LT CRL	LT CRL
PPDDT	2	1	50%	KK8	0.05	UGL	LT CRL	LT CRL	0.32
PRTHN	2	1	50%	UH11	0.65	UGL	LT CRL	LT CRL	2.00
SO4	2	2	100%	HH8A		MGL	470.00	440.00	500.00
SUPONA	1	1	100%	UH11		UGL	2.49	2.49	2.49
TCLEE	1	1	100%	N8		UGL	8.09	8.09	8.09
TRCLE	48	7	15%	N8	0.56	UGL	LT CRL	LT CRL	0.93
XYLEN	2	0	0%	AV8	1.36	UGL	LT CRL	LT CRL	LT CRL
ZN	2	0	0%	GG8, SS12	22.0, 18.0	UGL	LT CRL	LT CRL	LT CRL

D.P.A.

09/28/90

DATACHEM
FY 89 STATISTICAL SUMMARY
NORTH BOUNDARY SYSTEM

SITE: PNACIN

ANALYTE	TOT SAMP	SAMP >CRL	% > CRL	MTH NO.	CERTIFIED REPORT LIMIT (LT)	UOM	MEAN	LOW VALUE	HIGH VALUE
111TCE	2	0	0%	N8	0.76	UGL	LT CRL	LT CRL	LT CRL
112TCE	2	0	0%	N8	0.78	UGL	LT CRL	LT CRL	LT CRL
11DCE	2	0	0%	N8	1.70	UGL	LT CRL	LT CRL	LT CRL
11DCLE	2	0	0%	N8	0.73	UGL	LT CRL	LT CRL	LT CRL
12DCE	2	0	0%	N8	0.76	UGL	LT CRL	LT CRL	LT CRL
12DCLE	2	0	0%	N8	1.10	UGL	LT CRL	LT CRL	LT CRL
13DMB	2	1	50%	AV8	1.32	UGL	LT CRL	LT CRL	1.76
ALDRN	46	1	2%	KK8	0.05	UGL	LT CRL	LT CRL	0.07
AS	2	0	0%	AX8	2.35	UGL	LT CRL	LT CRL	LT CRL
ATZ	1	0	0%	UH11	4.03	UGL	LT CRL	LT CRL	LT CRL
BCHPD	1	0	0%	P8	5.90	UGL	LT CRL	LT CRL	LT CRL
BTZ	2	0	0%	AAA8	5.00	UGL	LT CRL	LT CRL	LT CRL
C6H6	2	0	0%	AV8	1.05	UGL	LT CRL	LT CRL	LT CRL
CA	2	2	100%	GG8, SS12		UGL	115,500.00	999.00	120,000
CCL4	2	1	50%	N8	0.99	UGL	LT CRL	LT CRL	2.11
CD	2	0	0%	GG8, SS12	8.40, 6.78	UGL	LT CRL	LT CRL	LT CRL
CH2CL2	2	0	0%	N8	7.40	UGL	LT CRL	LT CRL	LT CRL
CHCL3	2	1	50%	N8	0.50	UGL	LT CRL	LT CRL	0.57
CL	48	48	100%	HH8A, TT09		MGL	97.40	71.00	120.00
CL6CP	2	0	0%	KK8	0.05	UGL	LT CRL	LT CRL	LT CRL
CLC6H5	2	0	0%	N8	0.82	UGL	LT CRL	LT CRL	LT CRL
CLDAN	1	0	0%	KK8	0.10	UGL	LT CRL	LT CRL	LT CRL
CPMS	48	0	0%	AAA8	5.69	UGL	LT CRL	LT CRL	LT CRL
CPMSO	48	3	6%	AAA8	11.5	UGL	LT CRL	LT CRL	26.40
CPMSO2	48	1	2%	AAA8	7.46	UGL	LT CRL	LT CRL	18.10
CR	2	0	0%	GG8, SS12	24.0, 16.8	UGL	LT CRL	LT CRL	LT CRL
CU	2	0	0%	GG8, SS12	26.0, 11.9	UGL	LT CRL	LT CRL	LT CRL
DBCP	47	0	0%	AY8	0.20	UGL	LT CRL	LT CRL	LT CRL
DCPD	46	0	0%	P8	5.00	UGL	LT CRL	LT CRL	LT CRL
DDVP	1	0	0%	UH11	0.38	UGL	LT CRL	LT CRL	LT CRL
DIMP	46	46	100%	AW8A, AT8		UGL	4.11	2.64	9.14
DITH	48	3	6%	AAA8	1.34	UGL	LT CRL	LT CRL	20.20
DLDRN	47	46	98%	KK8	0.05	UGL	0.13	LT CRL	0.99
DMDS	2	0	0%	AAA8	0.55, 0.43	UGL	LT CRL	LT CRL	LT CRL
ENDRN	47	16	34%	KK8	0.05	UGL	LT CRL	LT CRL	0.22
ETC6H5	2	0	0%	AV8	1.37	UGL	LT CRL	LT CRL	LT CRL
F	48	48	100%	HH8A, TT09		MGL	2.26	1.57	2.86
HG	2	1	50%	CC8	0.10	UGL	LT CRL	LT CRL	0.11
ISODR	47	1	2%	KK8	0.05	UGL	LT CRL	LT CRL	0.34
K	2	2	100%	GG8, SS12		UGL	2,370.00	999.00	2,680
MEC6H5	2	0	0%	AV8	1.47	UGL	LT CRL	LT CRL	LT CRL
MG	2	2	100%	GG8, SS12		UGL	32,326.23	999.00	42,700
MLTHN	1	0	0%	UH11	0.37	UGL	LT CRL	LT CRL	LT CRL
NA	1	1	100%	SS12		UGL	180,000.00	999.00	180,000
OXAT	48	1	2%	AAA8	2.38	UGL	LT CRL	LT CRL	5.12
PB	2	0	0%	GG8, SS12	39.2, 43.4	UGL	LT CRL	LT CRL	LT CRL

D.P.A.

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DATACHEM
FY 89 STATISTICAL SUMMARY
NORTH BOUNDARY SYSTEM

SITE: PNACIN

ANALYTE	TOT SAMP	SAMP >CRL	% > CRL	MTH NO.	CERTIFIED REPORT LIMIT (LT)	UOM	MEAN	LOW VALUE	HIGH VALUE
PPDDE	2	0	0%	KK8	0.05	UGL	LT CRL	LT CRL	LT CRL
PPDDT	2	0	0%	KK8	0.05	UGL	LT CRL	LT CRL	LT CRL
PRTHN	2	1	50%	UH11	0.65	UGL	LT CRL	LT CRL	1.7
SO4	2	2	100%	HH8A		MGL	390.00	370.00	410.00
SUPONA	1	0	0%	UH11	0.77	UGL	LT CRL	LT CRL	LT CRL
TCLEE	1	0	0%	N8	0.75	UGL	LT CRL	LT CRL	LT CRL
TRCLE	47	1	2%	N8	0.56	UGL	LT CRL	LT CRL	2.48
XYLEN	2	0	0%	AV8	1.36	UGL	LT CRL	LT CRL	LT CRL
ZN	2	0	0%	GG8, SS12	22.0, 18.0	UGL	LT CRL	LT CRL	LT CRL

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DATACHEM
FY 89 STATISTICAL SUMMARY
NORTH BOUNDARY SYSTEM

SITE: PNEFIN

ANALYTE	TOT SAMP	SAMP >CRL	% > CRL	MTH NO.	CERTIFIED REPORT LIMIT (LT)	UOM	MEAN	LOW VALUE	HIGH VALUE
111TCE	2	0	0%	N8	0.76	UGL	LT CRL	LT CRL	LT CRL
112TCE	2	0	0%	N8	0.78	UGL	LT CRL	LT CRL	LT CRL
11DCE	2	0	0%	N8	1.70	UGL	LT CRL	LT CRL	LT CRL
11DCLE	2	0	0%	N8	0.73	UGL	LT CRL	LT CRL	LT CRL
12DCE	2	0	0%	N8	0.76	UGL	LT CRL	LT CRL	LT CRL
12DCLE	2	0	0%	N8	1.10	UGL	LT CRL	LT CRL	LT CRL
13DMB	2	0	0%	AV8	1.32	UGL	LT CRL	LT CRL	LT CRL
ALDRN	47	0	0%	KK8	0.05	UGL	LT CRL	LT CRL	LT CRL
AS	2	0	0%	AX8	2.35	UGL	LT CRL	LT CRL	LT CRL
ATZ	1	0	0%	UH11	4.03	UGL	LT CRL	LT CRL	LT CRL
BCHPD	1	0	0%	P8	5.90	UGL	LT CRL	LT CRL	LT CRL
BTZ	2	0	0%	AAA8	5.00	UGL	LT CRL	LT CRL	LT CRL
C6H6	2	1	50%	AV8	1.05	UGL	LT CRL	LT CRL	1.3
CA	2	2	100%	GG8, SS12		UGL	146,500.00	999.00	153,000
CCL4	2	0	0%	N8	0.99	UGL	LT CRL	LT CRL	LT CRL
CD	2	0	0%	GG8, SS12	8.40, 6.78	UGL	LT CRL	LT CRL	LT CRL
CH2CL2	2	0	0%	N8	7.40	UGL	LT CRL	LT CRL	LT CRL
CHCL3	2	1	50%	N8	0.50	UGL	LT CRL	LT CRL	0.80
CL	49	49	100%	HH8A, TT09		MGL	258.16	100.00	370.00
CL6CP	2	0	0%	KK8	0.05	UGL	LT CRL	LT CRL	LT CRL
CLC6H5	2	0	0%	N8	0.82	UGL	LT CRL	LT CRL	LT CRL
CLDAN	2	0	0%	KK8	0.10	UGL	LT CRL	LT CRL	LT CRL
CPMS	49	0	0%	AAA8	5.69	UGL	LT CRL	LT CRL	LT CRL
CPMSO	49	0	0%	AAA8	11.5	UGL	LT CRL	LT CRL	LT CRL
CPMSO2	49	0	0%	AAA8	7.46	UGL	LT CRL	LT CRL	LT CRL
CR	2	0	0%	GG8, SS12	24.0, 16.8	UGL	LT CRL	LT CRL	LT CRL
CU	2	0	0%	GG8, SS12	26.0, 11.9	UGL	LT CRL	LT CRL	LT CRL
DBCP	48	0	0%	AY8	0.20	UGL	LT CRL	LT CRL	LT CRL
DCPD	46	0	0%	P8	5.00	UGL	LT CRL	LT CRL	LT CRL
DDVP	1	0	0%	UH11	0.38	UGL	LT CRL	LT CRL	LT CRL
DIMP	47	46	98%	AW8A, AT8	0.65	UGL	2.45	LT CRL	10.70
DITH	49	0	0%	AAA8	1.34	UGL	LT CRL	LT CRL	LT CRL
DLDRN	48	1	2%	KK8	0.05	UGL	LT CRL	LT CRL	0.44
DMDS	2	0	0%	AAA8	0.55, 0.43	UGL	LT CRL	LT CRL	LT CRL
ENDRN	48	0	0%	KK8	0.05	UGL	LT CRL	LT CRL	LT CRL
ETC6H5	2	0	0%	AV8	1.37	UGL	LT CRL	LT CRL	LT CRL
F	49	49	100%	HH8A, TT09		MGL	3.23	2.37	4.05
HG	2	2	100%	CC8		UGL	0.19	0.15	0.24
ISODR	48	0	0%	KK8	0.05	UGL	LT CRL	LT CRL	LT CRL
K	2	2	100%	GG8, SS12		UGL	2,720.00	999.00	2,730
MEC6H5	2	0	0%	AV8	1.47	UGL	LT CRL	LT CRL	LT CRL
MG	2	2	100%	GG8, SS12		UGL	48,551.23	999.00	61,500
MLTHN	1	0	0%	UH11	0.37	UGL	LT CRL	LT CRL	LT CRL
NA	1	1	100%	SS12		UGL	270,000.00	999.00	270,000
OXAT	49	0	0%	AAA8	2.38	UGL	LT CRL	LT CRL	LT CRL
PB	2	0	0%	GG8, SS12	39.2, 43.4	UGL	LT CRL	LT CRL	LT CRL

D.P.A.

09/28/90

DATACHEM
FY 89 STATISTICAL SUMMARY
NORTH BOUNDARY SYSTEM

SITE: PNEFIN

ANALYTE	TOT SAMP	SAMP >CRL	% > CRL	MTH NO.	CERTIFIED REPORT LIMIT (LT)	UOM	MEAN	LOW VALUE	HIGH VALUE
PPDDE	2	0	0%	KK8	0.05	UGL	LT CRL	LT CRL	LT CRL
PPDDT	2	0	0%	KK8	0.05	UGL	LT CRL	LT CRL	LT CRL
PRTHN	2	0	0%	UH11	0.65	UGL	LT CRL	LT CRL	LT CRL
SO4	2	2	100%	HH8A		MGL	395.00	380.00	410.00
SUPONA	1	0	0%	UH11	0.77	UGL	LT CRL	LT CRL	LT CRL
TCLEE	1	0	0%	N8	0.75	UGL	LT CRL	LT CRL	LT CRL
TRCLE	49	0	0%	N8	0.56	UGL	LT CRL	LT CRL	LT CRL
XYLEN	2	0	0%	AV8	1.36	UGL	LT CRL	LT CRL	LT CRL
ZN	2	1	50%	GG8, SS12	18.0	UGL	LT CRL	LT CRL	29.2

ROCKY MOUNTAIN ARSENAL
NORTH BOUNDARY CONTAINMENT\TREATMENT SYSTEM
GC/MS ANALYTICAL DATA

LABORATORY: DATACHEM
SAMPLE DATE: 06/21/89
UNIT OF MEASURE: UGL

ANALYTE	CODE	PNAAIN	PNABIN	PNACIN	PNEFIN
2,3,6-TRICHLOROPHENOL	236TCP	LT 1.70	LT 1.70	LT 1.70	LT 1.70
2,4,5-TRICHLOROPHENOL	245TCP	LT 2.80	LT 2.80	LT 2.80	LT 2.80
2,4,6-TRICHLOROPHENOL	246TCP	LT 3.60	LT 3.60	LT 3.60	LT 3.60
2,4-DICHLOROPHENOL	24DCLP	LT 8.40	LT 8.40	LT 8.40	LT 8.40
2,4-DIMETHYLPHENOL	24DMPN	LT 4.40	LT 4.40	LT 4.40	LT 4.40
2,4-DINITROPHENOL	24DNP	LT 176.00	LT 176.00	LT 176.00	LT 176.00
2-CHLOROPHENOL	2CLP	LT 2.80	LT 2.80	LT 2.80	LT 2.80
2-METHYLPHENOL	2MP	LT 3.60	LT 3.60	LT 3.60	LT 3.60
2-NITROPHENOL	2NP	LT 8.20	LT 8.20	LT 8.20	LT 8.20
3-METHYL-4-CHLOROPHENOL	4CL3C	LT 8.50	LT 8.50	LT 8.50	LT 8.50
4-METHYLPHENOL	4MP	LT 2.80	LT 2.80	LT 2.80	LT 2.80
4-NITROPHENOL	4NP	LT 96.00	LT 96.00	LT 96.00	LT 96.00
ALDRIN	ALDRN	LT 13.00	LT 13.00	LT 13.00	LT 13.00
ATRAZINE	ATZ	LT 5.90	LT 5.90	LT 5.90	LT 5.90
HEXACHLOROCYCLOPENTADIENE (HCCPD)	CL6CP	LT 54.00	LT 54.00	LT 54.00	LT 54.00
CHLORDANE	CLDAN	LT 37.00	LT 37.00	LT 37.00	LT 37.00
P-CHLOROPHENYLMETHYL SULFIDE	CPMS	LT 10.00	LT 10.00	LT 10.00	LT 10.00
P-CHLOROPHENYLMETHYL SULFOXIDE	CPMSO	23.40	LT 15.00	LT 15.00	LT 15.00
P-CHLOROPHENYLMETHYL SULFONE	CPMSO2	62.90	LT 5.30	LT 5.30	LT 5.30
DIBROMOCHLOROPROPANE	DBCP	LT 12.00	LT 12.00	LT 12.00	LT 12.00
DICYCLOPENTADIENE	DCPD	290.00	15.10	LT 5.50	LT 5.50
VAPONA	DDVP	LT 8.50	LT 8.50	LT 8.50	LT 8.50
DIISOPROPYLMETHYLPHOSPHONATE	DIMP	GT 200.00	67.00	LT 21.00	LT 21.00
DITHIANE	DITH	20.00	LT 3.30	LT 3.30	LT 3.30
DIELDRIN	DLDRN	LT 26.00	LT 26.00	LT 26.00	LT 26.00
DIMETHYLMETHYLPHOSPHATE	DMMP	LT 130.00	LT 130.00	LT 130.00	LT 130.00
ENDRIN	ENDRN	LT 18.00	LT 18.00	LT 18.00	LT 18.00
ISODRIN	ISODR	LT 7.80	LT 7.80	LT 7.80	LT 7.80
MALATHION	MLTHN	LT 21.00	LT 21.00	LT 21.00	LT 21.00
1,4-OXATHIANE	OXAT	LT 27.00	LT 27.00	LT 27.00	LT 27.00
PENTACHLOROPHENOL	PCP	LT 9.10	LT 9.10	LT 9.10	LT 9.10
PHENOL	PHENOL	LT 2.20	LT 2.20	LT 2.20	LT 2.20
2,2-BIS(PARA-CHLOROPHENYL)-1,1-DICHLOROETHENE	PPDDE	LT 14.00	LT 14.00	LT 14.00	LT 14.00
2,2-BIS(PARA-CHLOROPHENYL)1,1,1-TRICHLOROETHANE	PPDDT	LT 18.00	LT 18.00	LT 18.00	LT 18.00
PARATHION	PRTHN	LT 37.00	LT 37.00	LT 37.00	LT 37.00
SUPONA	SUPONA	LT 19.00	LT 19.00	LT 19.00	LT 19.00

APPENDIX C

DEWATERING WELL DATA

D.P.A.

03/20/90

DATACHEM
FY 89 STATISTICAL SUMMARY
NORTH BOUNDARY DEWATERING WELLS

ANALYTE: ALDRN
CERTIFIED REPORTING LIMIT (LT): 0.05.

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	MTH NO.	UOM	MEAN	LOW VALUE	HIGH VALUE
30	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
31	2	1	50%	KK8	UGL	LT CRL	LT CRL	0.23
32	2	2	100%	KK8	UGL	0.17	0.17	0.17
33	2	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
34	2	1	50%	KK8	UGL	LT CRL	LT CRL	0.23
35	2	1	50%	KK8	UGL	LT CRL	LT CRL	0.13
1	3	1	33%	KK8	UGL	LT CRL	LT CRL	0.09
2	3	1	33%	KK8	UGL	LT CRL	LT CRL	0.15
3	3	2	67%	KK8	UGL	LT CRL	LT CRL	0.36
4	3	3	100%	KK8	UGL	0.32	0.12	0.66
5	2	1	50%	KK8	UGL	LT CRL	LT CRL	0.26
6	3	3	100%	KK8	UGL	0.15	0.08	0.27
7	2	2	100%	KK8	UGL	0.34	0.23	0.45
8	2	2	100%	KK8	UGL	0.20	0.18	0.22
9	3	2	67%	KK8	UGL	LT CRL	LT CRL	0.15
10	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
11	4	1	25%	KK8	UGL	LT CRL	LT CRL	0.10
12	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
13	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
14	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
15	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
16	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
17	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
18	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
19	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
20	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
21	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
22	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
23	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
24	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
25	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
26	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
27	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
28	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
29	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL

D.P.A.

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DATACHEM
FY 89 STATISTICAL SUMMARY
NORTH BOUNDARY DEWATERING WELLS

ANALYTE: BTZ
CERTIFIED REPORTING LIMIT (LT): 5

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	MTH NO.	UOM	MEAN	LOW VALUE	HIGH VALUE
24	1	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL

D.P.A.

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DATACHEM
FY 89 STATISTICAL SUMMARY
NORTH BOUNDARY DEWATERING WELLS

ANALYTE: CHLORIDE
CERTIFIED REPORTING LIMIT (LT): 0.72, 0.278

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	MTH NO.	UOM	MEAN	LOW VALUE	HIGH VALUE
30	2	2	100%	HH8A	MGL	285.00	250.00	320.00
31	3	3	100%	HH8A	MGL	310.00	290.00	340.00
32	3	3	100%	HH8A	MGL	510.00	430.00	600.00
33	3	3	100%	HH8A	MGL	1,033.33	999.00	1,100
34	3	3	100%	HH8A	MGL	913.33	710.00	1,100
35	3	3	100%	HH8A	MGL	283.33	240.00	330.00
1	3	3	100%	HH8A	MGL	186.67	160.00	210.00
2	3	3	100%	HH8A	MGL	316.67	280.00	380.00
3	3	3	100%	HH8A	MGL	903.33	850.00	1,000
4	3	3	100%	HH8A	MGL	1,500.00	999.00	1,600
5	2	2	100%	HH8A	MGL	995.00	890.00	1,100
6	3	3	100%	HH8A	MGL	616.67	490.00	760.00
7	2	2	100%	HH8A	MGL	435.00	390.00	480.00
8	2	2	100%	HH8A	MGL	250.00	200.00	300.00
9	3	3	100%	HH8A, TT09	MGL	276.67	150.00	420.00
10	3	3	100%	HH8A, TT09	MGL	180.00	120.00	270.00
11	5	5	100%	HH8A, TT09	MGL	244.00	100.00	560.00
12	4	4	100%	HH8A, TT09	MGL	129.25	97.00	200.00
13	3	3	100%	HH8A, TT09	MGL	120.00	100.00	150.00
14	4	4	100%	HH8A, TT09	MGL	98.75	93.00	110.00
15	4	4	100%	HH8A, TT09	MGL	96.00	88.00	110.00
16	3	3	100%	HH8A	MGL	79.33	77.00	82.00
17	4	4	100%	HH8A, TT09	MGL	74.50	66.00	86.00
18	3	3	100%	HH8A, TT09	MGL	75.67	68.00	81.00
19	4	4	100%	HH8A, TT09	MGL	93.75	84.00	110.00
20	4	4	100%	HH8A, TT09	MGL	99.25	93.00	110.00
21	3	3	100%	HH8A, TT09	MGL	88.33	81.00	100.00
22	3	3	100%	HH8A, TT09	MGL	78.33	72.00	84.00
23	3	3	100%	HH8A, TT09	MGL	93.33	76.00	120.00
24	3	3	100%	HH8A, TT09	MGL	97.67	90.00	110.00
25	3	3	100%	HH8A, TT09	MGL	103.00	99.00	110.00
26	3	3	100%	HH8A, TT09	MGL	83.67	69.00	98.00
27	3	3	100%	HH8A, TT09	MGL	77.67	69.00	89.00
28	3	3	100%	HH8A, TT09	MGL	180.00	160.00	210.00
29	3	3	100%	HH8A, TT09	MGL	153.33	120.00	180.00

D.P.A.

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DATACHEM
FY 89 STATISTICAL SUMMARY
NORTH BOUNDARY DEWATERING WELLS

ANALYTE: COMB. ORGANO-SULFUR
CERTIFIED REPORTING LIMIT (LT): 24.65

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	MTH NO.	UOM	MEAN	LOW VALUE	HIGH VALUE
30	2	0	0%	AAA8		LT CRL	LT CRL	LT CRL
31	3	0	0%	AAA8		LT CRL	LT CRL	LT CRL
32	3	0	0%	AAA8		LT CRL	LT CRL	LT CRL
33	3	3	100%	AAA8		111.68	45.59	233.15
34	3	3	100%	AAA8		56.79	43.09	76.00
35	3	1	33%	AAA8		LT CRL	LT CRL	30.02
1	3	0	0%	AAA8		LT CRL	LT CRL	LT CRL
2	3	2	67%	AAA8		LT CRL	LT CRL	27.99
3	3	3	100%	AAA8		50.42	43.39	54.09
4	3	3	100%	AAA8		171.59	94.59	307.19
5	2	2	100%	AAA8		224.75	122.51	326.99
6	3	3	100%	AAA8		246.81	119.13	491.40
7	2	2	100%	AAA8		73.03	34.36	111.70
8	2	2	100%	AAA8		90.63	87.46	93.80
9	3	3	100%	AAA8		64.30	48.85	77.68
10	3	3	100%	AAA8		44.22	39.95	47.15
11	4	3	75%	AAA8		47.34	LT CRL	98.90
12	4	2	50%	AAA8		LT CRL	LT CRL	33.65
13	3	0	0%	AAA8		LT CRL	LT CRL	LT CRL
14	4	0	0%	AAA8		LT CRL	LT CRL	LT CRL
15	4	0	0%	AAA8		LT CRL	LT CRL	LT CRL
16	3	0	0%	AAA8		LT CRL	LT CRL	LT CRL
17	4	0	0%	AAA8		LT CRL	LT CRL	LT CRL
18	3	0	0%	AAA8		LT CRL	LT CRL	LT CRL
19	4	0	0%	AAA8		LT CRL	LT CRL	LT CRL
20	4	0	0%	AAA8		LT CRL	LT CRL	LT CRL
21	4	0	0%	AAA8		LT CRL	LT CRL	LT CRL
22	4	0	0%	AAA8		LT CRL	LT CRL	LT CRL
23	4	0	0%	AAA8		LT CRL	LT CRL	LT CRL
24	4	0	0%	AAA8		LT CRL	LT CRL	LT CRL
25	3	0	0%	AAA8		LT CRL	LT CRL	LT CRL
26	3	0	0%	AAA8		LT CRL	LT CRL	LT CRL
27	3	0	0%	AAA8		LT CRL	LT CRL	LT CRL
28	3	0	0%	AAA8		LT CRL	LT CRL	LT CRL
29	4	0	0%	AAA8		LT CRL	LT CRL	LT CRL

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DATACHEM
FY 89 STATISTICAL SUMMARY
NORTH BOUNDARY DEWATERING WELLS

ANALYTE: DBCP
CERTIFIED REPORTING LIMIT (LT): 0.195

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	MTH NO.	UOM	MEAN	LOW VALUE	HIGH VALUE
30	2	0	0%	AY8	UGL	LT CRL	LT CRL	LT CRL
31	2	0	0%	AY8	UGL	LT CRL	LT CRL	LT CRL
32	2	0	0%	AY8	UGL	LT CRL	LT CRL	LT CRL
33	2	0	0%	AY8	UGL	LT CRL	LT CRL	LT CRL
34	2	0	0%	AY8	UGL	LT CRL	LT CRL	LT CRL
35	2	0	0%	AY8	UGL	LT CRL	LT CRL	LT CRL
1	3	0	0%	AY8	UGL	LT CRL	LT CRL	LT CRL
2	3	0	0%	AY8	UGL	LT CRL	LT CRL	LT CRL
3	3	0	0%	AY8	UGL	LT CRL	LT CRL	LT CRL
4	3	0	0%	AY8	UGL	LT CRL	LT CRL	LT CRL
5	2	1	50%	AY8	UGL	LT CRL	LT CRL	0.98
6	3	2	67%	AY8	UGL	LT CRL	LT CRL	1.81
7	2	2	100%	AY8	UGL	2.46	2.38	2.53
8	2	2	100%	AY8	UGL	3.53	3.21	3.84
9	3	3	100%	AY8	UGL	1.94	1.71	2.38
10	3	3	100%	AY8	UGL	1.00	0.89	1.14
11	5	4	80%	AY8	UGL	0.78	LT CRL	2.07
12	4	3	75%	AY8	UGL	0.29	LT CRL	C.41
13	3	3	100%	AY8	UGL	0.34	0.33	0.34
14	4	4	100%	AY8	UGL	0.31	0.23	0.44
15	4	4	100%	AY8	UGL	0.27	0.23	0.31
16	3	1	33%	AY8	UGL	LT CRL	LT CRL	0.22
17	4	0	0%	AY8	UGL	LT CRL	LT CRL	LT CRL
18	3	0	0%	AY8	UGL	LT CRL	LT CRL	LT CRL
19	4	0	0%	AY8	UGL	LT CRL	LT CRL	LT CRL
20	4	1	25%	AY8	UGL	LT CRL	LT CRL	0.23
21	4	0	0%	AY8	UGL	LT CRL	LT CRL	LT CRL
22	4	0	0%	AY8	UGL	LT CRL	LT CRL	LT CRL
23	4	0	0%	AY8	UGL	LT CRL	LT CRL	LT CRL
24	4	0	0%	AY8	UGL	LT CRL	LT CRL	LT CRL
25	3	0	0%	AY8	UGL	LT CRL	LT CRL	LT CRL
26	3	0	0%	AY8	UGL	LT CRL	LT CRL	LT CRL
27	3	0	0%	AY8	UGL	LT CRL	LT CRL	LT CRL
28	3	0	0%	AY8	UGL	LT CRL	LT CRL	LT CRL
29	4	0	0%	AY8	UGL	LT CRL	LT CRL	LT CRL

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DATACHEM
FY 89 STATISTICAL SUMMARY
NORTH BOUNDARY DEWATERING WELLS

ANALYTE: DCPD
CERTIFIED REPORTING LIMIT (LT): 5

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	MTH NO.	UOM	MEAN	LOW VALUE	HIGH VALUE
30	2	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL
31	3	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL
32	3	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL
33	3	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL
34	3	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL
35	3	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL
1	3	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL
2	3	3	100%	P8	UGL	60.07	50.40	77.10
3	3	3	100%	P8	UGL	500.00	400.00	600.00
4	3	3	100%	P8	UGL	766.67	630.00	1,000
5	2	2	100%	P8	UGL	640.00	630.00	650.00
6	3	3	100%	P8	UGL	290.00	270.00	320.00
7	2	1	50%	P8	UGL	LT CRL	LT CRL	175.00
8	2	2	100%	P8	UGL	84.35	64.70	104.00
9	3	3	100%	P8	UGL	65.17	42.20	82.90
10	3	3	100%	P8	UGL	33.53	16.10	66.50
11	3	2	67%	P8	UGL	LT CRL	LT CRL	139.00
12	3	1	33%	P8	UGL	LT CRL	LT CRL	16.80
13	2	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL
14	3	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL
15	3	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL
16	2	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL
17	3	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL
18	3	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL
19	3	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL
20	2	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL
21	2	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL
22	2	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL
23	2	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL
24	2	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL
25	3	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL
26	3	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL
27	3	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL
28	3	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL
29	3	0	0%	P8	UGL	LT CRL	LT CRL	LT CRL

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DATACHEM
FY 89 STATISTICAL SUMMARY
NORTH BOUNDARY DEWATERING WELLS

ANALYTE: DIMP
CERTIFIED REPORTING LIMIT (LT): 0.65

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	MTH NO.	UOM	MEAN	LOW VALUE	HIGH VALUE
30	3	1	33%	AW8A	UGL	LT CRL	LT CRL	2.46
31	2	2	100%	AW8A	UGL	8.25	3.99	12.50
32	2	2	100%	AW8A	UGL	100.00	100.00	100.00
33	2	2	100%	AW8A	UGL	635.00	580.00	690.00
34	2	2	100%	AW8A	UGL	303.79	7.58	600.00
35	2	2	100%	AW8A	UGL	520.00	490.00	550.00
1	3	3	100%	AW8A	UGL	167.81	3.43	290.00
2	3	3	100%	AW8A	UGL	1,133.33	999.00	1,200
3	3	3	100%	AW8A	UGL	1,166.67	999.00	1,300
4	3	3	100%	AW8A	UGL	1,266.67	999.00	1,300
5	2	2	100%	AW8A	UGL	930.00	860.00	1,000
6	3	3	100%	AW8A	UGL	680.00	580.00	830.00
7	2	2	100%	AW8A	UGL	435.00	420.00	450.00
8	2	2	100%	AW8A	UGL	225.00	220.00	230.00
9	3	3	100%	AW8A	UGL	250.00	150.00	400.00
10	3	3	100%	AW8A	UGL	193.33	140.00	300.00
11	4	4	100%	AW8A	UGL	219.25	97.00	540.00
12	4	4	100%	AW8A	UGL	115.25	93.00	170.00
13	3	3	100%	AW8A	UGL	96.33	79.00	120.00
14	4	4	100%	AW8A	UGL	77.70	67.70	84.20
15	4	4	100%	AW8A	UGL	64.48	57.60	67.30
16	3	3	100%	AW8A	UGL	26.60	4.20	40.50
17	4	4	100%	AW8A	UGL	13.68	11.30	15.10
18	3	3	100%	AW8A	UGL	8.18	7.09	8.99
19	4	4	100%	AW8A	UGL	4.50	3.28	5.23
20	4	4	100%	AW8A	UGL	4.87	4.65	5.26
21	4	4	100%	AW8A	UGL	4.34	3.50	5.73
22	4	4	100%	AW8A	UGL	2.88	2.05	4.14
23	4	4	100%	AW8A	UGL	4.12	2.54	5.82
24	4	4	100%	AW8A	UGL	3.53	2.96	4.38
25	3	3	100%	AW8A	UGL	3.49	2.51	4.00
26	3	3	100%	AW8A	UGL	2.08	1.64	2.41
27	3	3	100%	AW8A	UGL	1.39	1.30	1.46
28	3	3	100%	AW8A	UGL	1.87	1.62	2.24
29	3	2	67%	AW8A	UGL	LT CRL	LT CRL	1.14

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DATACHEM
FY 89 STATISTICAL SUMMARY
NORTH BOUNDARY DEWATERING WELLS

ANALYTE: DITH
CERTIFIED REPORTING LIMIT (LT): 1.34

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	MTH NO.	UOM	MEAN	LOW VALUE	HIGH VALUE
30	2	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
31	3	1	33%	AAA8	UGL	LT CRL	LT CRL	1.57
32	3	2	67%	AAA8	UGL	LT CRL	LT CRL	9.80
33	3	3	100%	AAA8	UGL	18.07	12.10	21.10
34	3	2	67%	AAA8	UGL	LT CRL	20.30	50.00
35	3	3	100%	AAA8	UGL	13.38	8.10	22.20
1	3	3	100%	AAA8	UGL	13.53	1.99	25.70
2	3	3	100%	AAA8	UGL	22.40	18.50	26.70
3	3	3	100%	AAA8	UGL	28.93	4.08	54.00
4	3	3	100%	AAA8	UGL	40.53	18.00	75.00
5	2	2	100%	AAA8	UGL	28.95	24.90	33.00
6	3	3	100%	AAA8	UGL	19.03	13.80	27.10
7	2	1	50%	AAA8	UGL	LT CRL	LT CRL	12.70
8	2	1	50%	AAA8	UGL	LT CRL	LT CRL	5.22
9	3	2	67%	AAA8	UGL	LT CRL	LT CRL	5.30
10	3	1	33%	AAA8	UGL	LT CRL	LT CRL	2.49
11	4	1	25%	AAA8	UGL	LT CRL	LT CRL	7.63
12	4	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
13	3	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
14	4	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
15	4	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
16	3	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
17	4	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
18	3	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
19	4	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
20	4	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
21	4	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
22	4	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
23	4	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
24	4	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
25	3	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
26	3	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
27	3	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
28	3	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
29	4	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL

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DATACHEM
FY 89 STATISTICAL SUMMARY
NORTH BOUNDARY DEWATERING WELLS

ANALYTE: DLDRN
CERTIFIED REPORTING LIMIT (LT): 0.05

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	MTH NO.	UOM	MEAN	LOW VALUE	HIGH VALUE
30	3	2	67%	KK8	UGL	LT CRL	LT CRL	0.18
31	2	2	100%	KK8	UGL	0.16	0.13	0.20
32	2	2	100%	KK8	UGL	0.51	0.43	0.59
33	2	2	100%	KK8	UGL	0.66	0.61	0.71
34	2	2	100%	KK8	UGL	0.75	0.70	0.80
35	2	2	100%	KK8	UGL	0.62	0.53	0.71
1	3	3	100%	KK8	UGL	0.30	0.26	0.36
2	3	3	100%	KK8	UGL	2.81	0.30	7.70
3	3	3	100%	KK8	UGL	1.37	1.20	1.60
4	3	3	100%	KK8	UGL	2.97	2.40	3.90
5	2	2	100%	KK8	UGL	3.90	3.30	4.50
6	3	3	100%	KK8	UGL	3.14	0.32	5.10
7	2	2	100%	KK8	UGL	4.20	4.20	4.20
8	2	2	100%	KK8	UGL	3.40	3.40	3.40
9	3	3	100%	KK8	UGL	2.07	1.50	2.80
10	3	3	100%	KK8	UGL	0.90	0.76	1.10
11	4	4	100%	KK8	UGL	0.86	0.47	1.40
12	4	4	100%	KK8	UGL	0.38	0.35	0.45
13	3	3	100%	KK8	UGL	0.40	0.34	0.46
14	4	4	100%	KK8	UGL	0.28	0.27	0.29
15	4	4	100%	KK8	UGL	0.28	0.26	0.31
16	3	3	100%	KK8	UGL	0.08	0.07	0.09
17	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
18	3	2	67%	KK8	UGL	LT CRL	LT CRL	0.05
19	4	4	100%	KK8	UGL	0.35	0.09	0.99
20	3	3	100%	KK8	UGL	0.18	0.07	0.25
21	3	3	100%	KK8	UGL	0.16	0.15	0.18
22	3	3	100%	KK8	UGL	0.13	0.11	0.14
23	3	3	100%	KK8	UGL	0.07	0.06	0.07
24	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
25	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
26	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
27	4	3	75%	KK8	UGL	0.07	LT CRL	0.09
28	4	1	25%	KK8	UGL	LT CRL	LT CRL	0.06
29	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL

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DATACHEM
FY 89 STATISTICAL SUMMARY
NORTH BOUNDARY DEWATERING WELLS

ANALYTE: DMDS
CERTIFIED REPORTING LIMIT (LT): 0.55

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	MTH NO.	UOM	MEAN	LOW VALUE	HIGH VALUE
24	1	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL

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DATACHEM
FY 89 STATISTICAL SUMMARY
NORTH BOUNDARY DEWATERING WELLS

ANALYTE: ENDRN
CERTIFIED REPORTING LIMIT (LT): 0.05

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	MTH NO.	UOM	MEAN	LOW VALUE	HIGH VALUE
30	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
31	2	2	100%	KK8	UGL	0.24	0.10	0.39
32	2	1	50%	KK8	UGL	LT CRL	LT CRL	0.14
33	2	1	50%	KK8	UGL	LT CRL	LT CRL	0.20
34	2	2	100%	KK8	UGL	0.19	0.16	0.21
35	2	2	100%	KK8	UGL	0.10	0.08	0.12
1	3	2	67%	KK8	UGL	LT CRL	LT CRL	0.07
2	3	3	100%	KK8	UGL	0.28	0.11	0.60
3	3	3	100%	KK8	UGL	1.57	1.20	1.90
4	3	3	100%	KK8	UGL	2.63	1.70	3.80
5	2	2	100%	KK8	UGL	2.00	1.80	2.20
6	3	3	100%	KK8	UGL	2.49	0.06	3.70
7	2	2	100%	KK8	UGL	3.45	3.30	3.60
8	2	2	100%	KK8	UGL	3.00	2.80	3.20
9	3	3	100%	KK8	UGL	1.57	1.30	2.00
10	3	3	100%	KK8	UGL	0.71	0.67	0.75
11	4	4	100%	KK8	UGL	0.72	0.45	1.10
12	4	4	100%	KK8	UGL	0.32	0.25	0.35
13	3	3	100%	KK8	UGL	0.37	0.36	0.38
14	4	4	100%	KK8	UGL	0.30	0.26	0.36
15	4	4	100%	KK8	UGL	0.33	0.30	0.38
16	3	3	100%	KK8	UGL	0.08	0.07	0.09
17	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
18	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
19	4	3	75%	KK8	UGL	0.06	LT CRL	0.08
20	3	2	67%	KK8	UGL	LT CRL	LT CRL	0.08
21	3	3	100%	KK8	UGL	0.05	0.05	0.06
22	3	3	100%	KK8	UGL	0.06	0.05	0.07
23	3	1	33%	KK8	UGL	LT CRL	LT CRL	0.04
24	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
25	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
26	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
27	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
28	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
29	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL

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DATACHEM
FY 89 STATISTICAL SUMMARY
NORTH BOUNDARY DEWATERING WELLS

ANALYTE: FLUORIDE
CERTIFIED REPORTING LIMIT (LT): 0.482, 0.153

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	MTH NO.	UOM	MEAN	LOW VALUE	HIGH VALUE
30	2	2	100%	HH8A	MGL	4.02	3.37	4.67
31	3	3	100%	HH8A	MGL	4.43	3.30	5.05
32	3	3	100%	HH8A	MGL	4.38	4.17	4.60
33	3	3	100%	HH8A	MGL	5.11	4.60	6.00
34	3	3	100%	HH8A	MGL	4.90	4.10	5.60
35	3	3	100%	HH8A	MGL	4.35	3.38	5.16
1	3	3	100%	HH8A	MGL	5.06	4.68	5.50
2	3	3	100%	HH8A	MGL	3.79	3.37	4.24
3	3	3	100%	HH8A	MGL	5.33	4.18	6.10
4	3	3	100%	HH8A	MGL	6.91	4.02	9.40
5	2	2	100%	HH8A	MGL	6.25	6.10	6.40
6	3	3	100%	HH8A	MGL	4.79	4.08	5.30
7	2	2	100%	HH8A	MGL	3.52	3.04	4.00
8	2	2	100%	HH8A	MGL	3.35	2.99	3.70
9	3	3	100%	HH8A, TT09	MGL	3.46	3.00	3.89
10	3	3	100%	HH8A, TT09	MGL	3.11	2.65	3.63
11	5	5	100%	HH8A, TT09	MGL	3.13	1.72	4.07
12	4	4	100%	HH8A, TT09	MGL	3.35	2.81	3.87
13	3	3	100%	HH8A, TT09	MGL	3.45	3.10	3.80
14	4	4	100%	HH8A, TT09	MGL	3.31	2.73	3.81
15	4	4	100%	HH8A, TT09	MGL	3.25	2.65	3.72
16	3	3	100%	HH8A	MGL	3.22	2.87	3.48
17	4	4	100%	HH8A, TT09	MGL	2.79	2.49	3.12
18	3	3	100%	HH8A, TT09	MGL	2.68	2.46	3.04
19	4	4	100%	HH8A, TT09	MGL	2.00	1.73	2.19
20	4	4	100%	HH8A, TT09	MGL	2.05	1.72	2.39
21	3	3	100%	HH8A, TT09	MGL	1.76	1.59	1.84
22	3	3	100%	HH8A, TT09	MGL	1.82	1.60	1.93
23	3	3	100%	HH8A, TT09	MGL	2.04	1.91	2.13
24	3	3	100%	HH8A, TT09	MGL	2.21	2.05	2.31
25	3	3	100%	HH8A, TT09	MGL	2.15	1.93	2.26
26	3	3	100%	HH8A, TT09	MGL	2.42	2.19	2.64
27	3	3	100%	HH8A, TT09	MGL	2.52	2.25	2.72
28	3	3	100%	HH8A, TT09	MGL	3.49	3.38	3.60
29	3	3	100%	HH8A, TT09	MGL	3.67	3.12	4.70

D.P.A.

03/20/90

DATACHEM
FY 89 STATISTICAL SUMMARY
NORTH BOUNDARY DEWATERING WELLS

ANALYTE: ISODR
CERTIFIED REPORTING LIMIT (LT): 0.051

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	MTH NO.	UOM	MEAN	LOW VALUE	HIGH VALUE
30	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
31	2	2	100%	KK8	UGL	0.13	0.09	0.18
32	2	1	50%	KK8	UGL	LT CRL	LT CRL	0.07
33	2	1	50%	KK8	UGL	LT CRL	LT CRL	0.30
34	2	2	100%	KK8	UGL	0.62	0.26	0.98
35	2	1	50%	KK8	UGL	LT CRL	LT CRL	0.09
1	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
2	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
3	3	2	67%	KK8	UGL	LT CRL	LT CRL	0.13
4	3	3	100%	KK8	UGL	0.24	0.13	0.42
5	2	1	50%	KK8	UGL	LT CRL	LT CRL	0.09
6	3	2	67%	KK8	UGL	LT CRL	LT CRL	0.21
7	2	1	50%	KK8	UGL	LT CRL	LT CRL	0.33
8	2	1	50%	KK8	UGL	LT CRL	LT CRL	0.21
9	3	2	67%	KK8	UGL	LT CRL	LT CRL	0.07
10	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
11	4	2	50%	KK8	UGL	LT CRL	LT CRL	0.47
12	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
13	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
14	4	1	25%	KK8	UGL	LT CRL	LT CRL	0.28
15	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
16	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
17	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
18	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
19	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
20	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
21	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
22	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
23	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
24	3	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
25	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
26	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
27	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
28	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL
29	4	0	0%	KK8	UGL	LT CRL	LT CRL	LT CRL

D.P.A.

03/20/90

DATACHEM
FY 89 STATISTICAL SUMMARY
NORTH BOUNDARY DEWATERING WELLS

ANALYTE: OXAT
CERTIFIED REPORTING LIMIT (LT): 2.38

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	MTH NO.	UOM	MEAN	LOW VALUE	HIGH VALUE
30	2	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
31	3	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
32	3	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
33	3	3	100%	AAA8	UGL	4.71	4.38	4.91
34	3	3	100%	AAA8	UGL	5.22	4.67	5.70
35	3	3	100%	AAA8	UGL	3.27	2.58	4.15
1	3	2	67%	AAA8	UGL	LT CRL	LT CRL	3.71
2	3	3	100%	AAA8	UGL	4.45	4.15	4.97
3	3	2	67%	AAA8	UGL	LT CRL	LT CRL	8.11
4	3	2	67%	AAA8	UGL	LT CRL	7.18	9.32
5	2	2	100%	AAA8	UGL	5.92	5.17	6.66
6	3	3	100%	AAA8	UGL	3.27	3.02	3.59
7	2	2	100%	AAA8	UGL	5.42	2.77	8.06
8	2	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
9	3	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
10	3	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
11	4	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
12	4	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
13	3	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
14	4	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
15	4	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
16	3	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
17	4	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
18	3	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
19	4	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
20	4	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
21	4	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
22	4	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
23	4	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
24	4	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
25	3	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
26	3	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
27	3	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
28	3	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL
29	4	0	0%	AAA8	UGL	LT CRL	LT CRL	LT CRL

D.P.A.

03/20/90

DATACHEM
FY 89 STATISTICAL SUMMARY
NORTH BOUNDARY DEWATERING WELLS

ANALYTE: TRCLE
CERTIFIED REPORTING LIMIT (LT): 0.56

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	MTH NO.	UOM	MEAN	LOW VALUE	HIGH VALUE
30	3	0	0%	N8	UGL	LT CRL	LT CRL	LT CRL
31	2	0	0%	N8	UGL	LT CRL	LT CRL	LT CRL
32	2	0	0%	N8	UGL	LT CRL	LT CRL	LT CRL
33	2	2	100%	N8	UGL	0.73	0.68	0.78
34	2	2	100%	N8	UGL	0.76	0.74	0.79
35	2	0	0%	N8	UGL	LT CRL	LT CRL	LT CRL
1	3	0	0%	N8	UGL	LT CRL	LT CRL	LT CRL
2	3	3	100%	N8	UGL	1.02	0.97	1.12
3	3	3	100%	N8	UGL	6.64	6.07	7.32
4	3	3	100%	N8	UGL	9.27	8.15	11.40
5	2	2	100%	N8	UGL	5.71	5.12	6.29
6	3	3	100%	N8	UGL	3.76	3.68	3.86
7	2	2	100%	N8	UGL	2.58	2.40	2.75
8	2	2	100%	N8	UGL	1.40	1.10	1.70
9	3	2	67%	N8	UGL	LT CRL	LT CRL	1.44
10	3	2	67%	N8	UGL	LT CRL	LT CRL	0.84
11	4	1	25%	N8	UGL	LT CRL	LT CRL	2.16
12	4	0	0%	N8	UGL	LT CRL	LT CRL	LT CRL
13	3	0	0%	N8	UGL	LT CRL	LT CRL	LT CRL
14	4	0	0%	N8	UGL	LT CRL	LT CRL	LT CRL
15	4	0	0%	N8	UGL	LT CRL	LT CRL	LT CRL
16	3	0	0%	N8	UGL	LT CRL	LT CRL	LT CRL
17	4	0	0%	N8	UGL	LT CRL	LT CRL	LT CRL
18	3	0	0%	N8	UGL	LT CRL	LT CRL	LT CRL
19	4	0	0%	N8	UGL	LT CRL	LT CRL	LT CRL
20	4	0	0%	N8	UGL	LT CRL	LT CRL	LT CRL
21	4	0	0%	N8	UGL	LT CRL	LT CRL	LT CRL
22	4	0	0%	N8	UGL	LT CRL	LT CRL	LT CRL
23	4	0	0%	N8	UGL	LT CRL	LT CRL	LT CRL
24	4	0	0%	N8	UGL	LT CRL	LT CRL	LT CRL
25	4	0	0%	N8	UGL	LT CRL	LT CRL	LT CRL
26	4	0	0%	N8	UGL	LT CRL	LT CRL	LT CRL
27	4	0	0%	N8	UGL	LT CRL	LT CRL	LT CRL
28	4	0	0%	N8	UGL	LT CRL	LT CRL	LT CRL
29	4	0	0%	N8	UGL	LT CRL	LT CRL	LT CRL

APPENDIX D

NORTH BOUNDARY SYSTEM DOWNTIME

NORTH BOUNDARY

1st QUARTER FISCAL YEAR 89

QUARTERLY DOWNTIME SUMMARY

DATE	ADS/TIME LOSS	JUSTIFICATION
3 Oct 88	All/1.83 hrs	Maintenance - Repair Electrical cable
4 Oct 88	"A"/3.50 hrs	Carbon Transfer
5 Oct 88	"A"/0.66 hrs	Operations - Achieve proper fluoride discharge level
5 Oct 88	"C"/19.0 hrs	Maintenance - broken flange
6 Oct 88	"A"/23.0 hrs	Operation - Achieve proper fluoride discharge level
6 Oct 88	"C"/24.0 hrs	Maintenance - Drain Adsorber
7 Oct 88	"A"/24.0 hrs	Operations - Achieve proper fluoride discharge levels
7 Oct 88	"C"/24.5 hrs	Maintenance - Remove and replace flange
11 Oct 88	"B"/3.00 hrs	Carbon Transfer
18 Oct 88	"A"/4.00 hrs	Carbon Transfer
25 Oct 88	"B"/4.25 hrs	Carbon Transfer
31 Oct 88	All/1.50 hrs	Power out to plant/connect RC trench power
1 Nov 88	"A"/3.00 hrs	Carbon Transfer
3 Nov 88	"B"/0.62 hrs	Carbon Transfer (Top Off)
3 Nov 88	"C"/0.62 hrs	Carbon Transfer (Top Off)
15 Nov 88	All/5.50 hrs	Carbon Load
17 Nov 88	"A"/2.00 hrs	Carbon Transfer
18 Nov 88	"B"/2.00 hrs	Carbon Transfer
19 Nov 88	"C"/2.00 hrs	Carbon Transfer
22 Nov 88	"A"/3.00 hrs	Carbon Transfer
29 Nov 88	"B"/3.00 hrs	Carbon Transfer
6 Dec 88	"A"/2.00 hrs	Carbon Transfer
13 Dec 88	All/4.33 hrs	Carbon Load
20 Dec 88	"B"/3.00 hrs	Carbon Transfer
22 Dec 88	All/7.00 hrs	Electrical Outage/Bad "Y" Strainer
22 Dec 88	"C"/1.50 hrs	Repair In-Line Valve

1st QUARTER REPORT

FISCAL YEAR 1989

NORTH BOUNDARY PLANT
DOWNTIME SUMMARY BY ADSORBER

ADSORBER	TIME LOSS (HRS)			
	OCT 88	NOV 88	DEC 88	1st QTR FY 1989
A	55.16	8.00	2.00	65.16
B	7.25	5.62	3.00	15.87
C	67.50	2.62	1.50	71.62
ALL (at the same time)	3.33	5.50	11.33	20.16

NORTH BOUNDARY SYSTEM
PLANT DOWNTIME SUMMARY
2ND QUARTER 1989

PERIOD: 1 Jan. - 1 Apr. '89

DATE	ADS/LOSS TIME	JUSTIFICATION
3 Jan '89	'B'/3.00 hrs	Carbon Transfer
10 Jan '89	'A'/4.00 hrs	Carbon Transfer
17 Jan '89	ALL/4.00 hrs	Unload Carbon Truck
23 Jan '89	'A'/4.50 hrs	Carbon Transfer
24 Jan '89	'B'/3.00 hrs	Carbon Transfer
31 Jan '89	'B'/2.83 hrs	Carbon Transfer
7 Feb '89	'A"/2.50 hrs	Carbon Transfer
16 Feb '89	'B'/4.00 hrs	Carbon Transfer
21 Feb '89	'A'/3.75 hrs	Carbon Transfer
28 Feb '89	'B'/3.50 hrs	Carbon Transfer
7 Mar '89	'A'/3.60 hrs	Carbon Transfer
20 Mar '89	'B'/3.00 hrs	Carbon Transfer
21 Mar '89	'A'/3.80 hrs	Carbon Transfer
28 Mar '89	'B'/3.20 hrs	Carbon Transfer

BOUNDARY SYSTEMS
DOWNTIME BY ADSORBER
2ND QUARTER FY 1989

Period: 1 Jan. - 1 Apr. '89

NORTH BOUNDARY PLANT:

ADSORBER	JAN. '89	FEB. '89	MAR. '89	TOTAL 2ND QTR.
'A'	8.50	6.25	7.40	22.15
'B'	8.83	7.50	6.20	22.53
'C'	0.00	0.00	0.00	0.00
ALL (Same Time)	4.00	0.00	0.00	4.00

NORTH BOUNDARY SYSTEM
PLANT DOWNTIME SUMMARY
3RD QUARTER 1989

Period: 1 Apr. - 1 July '89

DATE	ADS/LOSS TIME	JUSTIFICATION
4 Apr '89	'A'/2.00 hrs	Carbon Transfer
10 Apr '89	'B'/3.25 hrs	Carbon Transfer
18 Apr '89	'A'/4.17 hrs	Carbon Transfer
25 Apr '89	'B'/2.75 hrs	Carbon Transfer
2 May '89	'A'/4.00 hrs	Carbon Transfer
9 May '89	'B'/3.00 hrs	Carbon Transfer
18 May '89	'B'/1.00 hrs	Replace Flowmeter
23 May '89	'A'/5.00 hrs	Carbon Transfer
31 May '89	'B'/3.00 hrs	Carbon Transfer
6 June '89	'A'/4.00 hrs	Carbon Transfer
8 June '89	ALL/0.33 hrs	Sump Overflow
10 June '89	'B'/47 58 hrs	Repair/Feed Pump
13 June '89	'B'/4.00 hrs	Carbon Transfer
27 June '89	'A'/5.25 hrs	Carbon Transfer

BOUNDARY SYSTEMS
DOWNTIME BY ADSORBER
3RD QUARTER FY 1989

Period: 1 Apr. - 1 July '89

NORTH BOUNDARY PLANT:

ADSORBER	JAN. '89	FEB. '89	MAR. '89	TOTAL 2ND QTR.
'A'	6.17	9.00	9.25	24.42
'B'	6.00	7.00	51.58	64.58
'C'	0.00	0.00	0.00	0.00
ALL (Same Time)	0.00	0.00	0.33	4.33

NORTH BOUNDARY SYSTEM
PLANT DOWNTIME SUMMARY
4TH QUARTER 1989

Period: 1 July - 1 Oct. '89

DATE	ADS/LOSS TIME	JUSTIFICATION
3 Jul '89	'B'/3.25 hrs	Carbon Transfer
11 Jul '89	'A'/4.50 hrs	Carbon Transfer
17 Jul '89	'B'/5.17 hrs	Carbon Transfer
25 Jul '89	'A'/4.00 hrs	Carbon Transfer
1 Aug '89	'A'/3.25 hrs	Carbon Transfer
7 Aug '89	ALL/0.83 hrs	Plugged Filters
8 Aug '89	'A'/5.30 hrs	Carbon Load
10 Aug '89	ALL/4.00 hrs	Power Off/Maint.
15 Aug '89	'B'/3.67 hrs	Carbon Transfer
21 Aug '89	'A'/0.33 hrs	Carbon Transfer
29 Aug '89	'A'/4.58 hrs	Carbon Transfer
5 Sep '89	'B'/4.00 hrs	Carbon Transfer
7 Sep '89	ALL/0.33 hrs	High Effl. Sump
12 Sep '89	'A'/4.25 hrs	Carbon Transfer
12 Sep '89	'B'/4.25 hrs	Carbon Transfer
18 Sep '89	ALL/0.75 hrs	High Effl. Sump
19 Sep '89	'B'/3.17 hrs	Carbon Transfer
25 Sep '89	'A'/1.00 hrs	Carbon Transfer

BOUNDARY SYSTEMS
DOWNTIME BY ADSORBER
4TH QUARTER FY 1989

Period: 1 July - 1 Oct. '89

NORTH BOUNDARY PLANT:

ADSORBER	JAN. '89	FEB. '89	MAR. '89	TOTAL 2ND QTR.
'A'	8.50	13.46	5.25	27.21
'B'	8.42	3.67	11.42	23.51
'C'	0.00	0.00	0.00	0.00
ALL (Same Time)	0.00	4.83	1.08	5.91